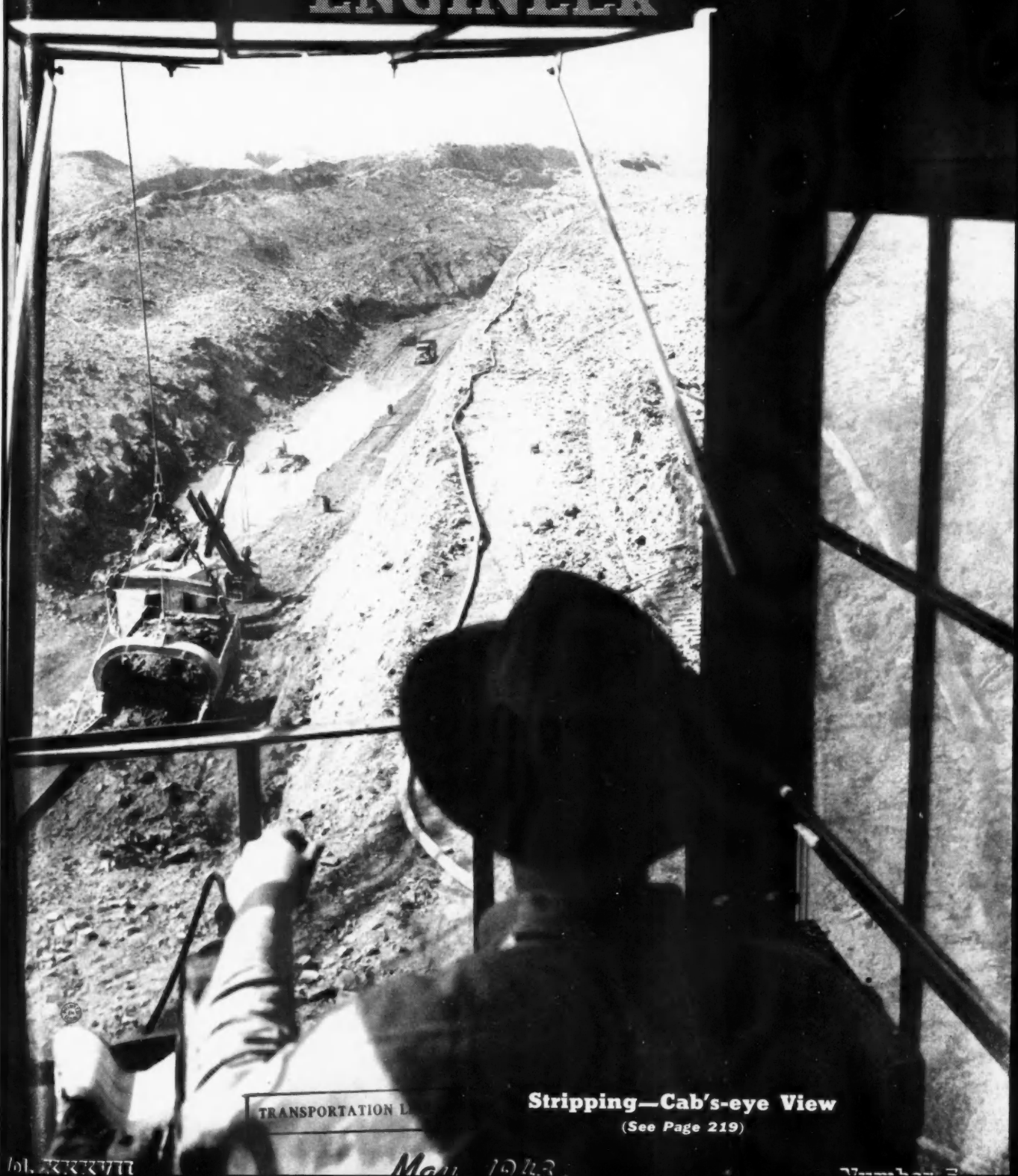
EXCAVATING ENGINEER



Stripping—Cab's-eye View

(See Page 219)

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EXCAVATING ENGINEER

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RAILROADING CROSSES A NEW FRONTIER

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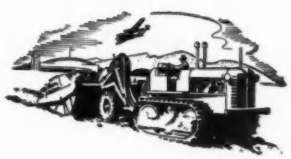
Here Currier and Ives, the famous portrayers of American life of the past century, depict one of the great eras of railroading—the achievement of rail transportation from East to West—the opening up of new lands and unexploited resources.

WARS have a way of ending old eras and starting new ones. Following the Peace of 1865, the nation was first united from coast to coast by bands of steel (May 10, 1869). Geographically, America has no new frontiers. Technically we have many. The curtain already has been drawn back on one element of the new era that surely will follow the present conflict —a new tool for the improvement of national transportation—General Motors locomotives.



Reconstruction and new construction are going to need plenty of this hard-hitting, easy-on-the-fuel power. With normal refinement and development speeded up by war, with production expanded, GM Diesels will be ready to serve in more fields and in more ways than ever.

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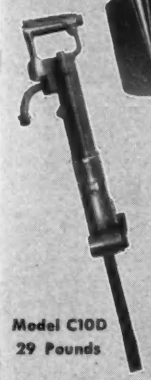

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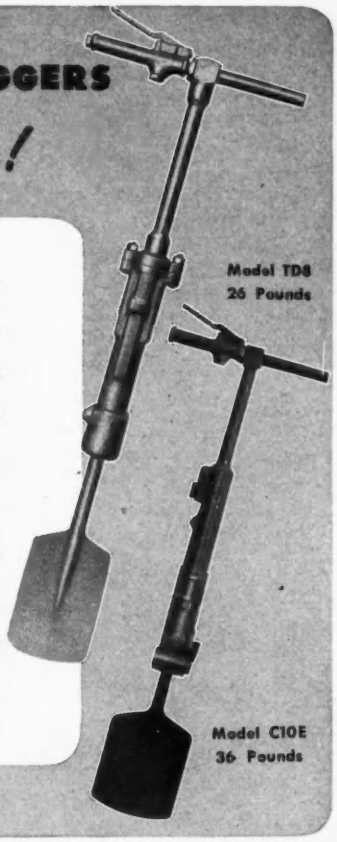

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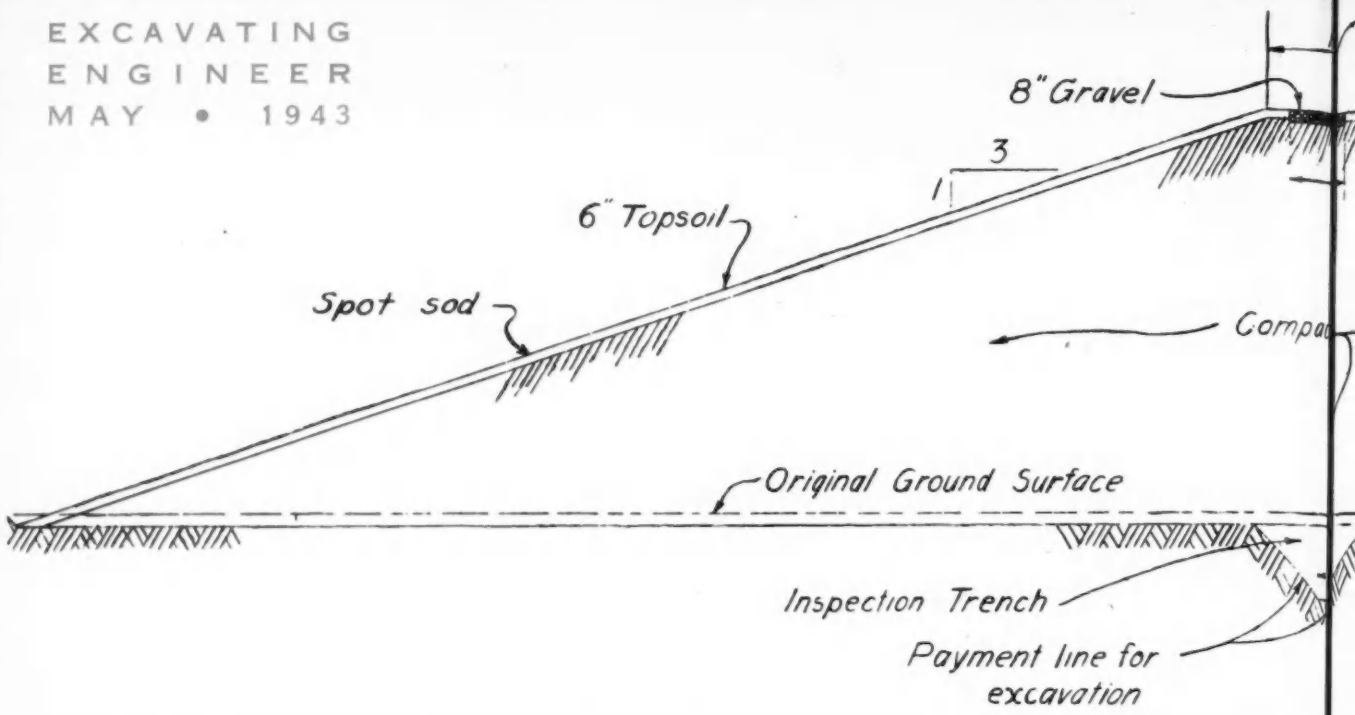


Barker Dam
A Mammoth Levee

As this article goes to press word is received that the WPB as lifted its stop order on this $32,000,000 Flood Control project and authorized its completion as the result of a finding that the possibility of flood damage could be more serious now than at the beginning of the work

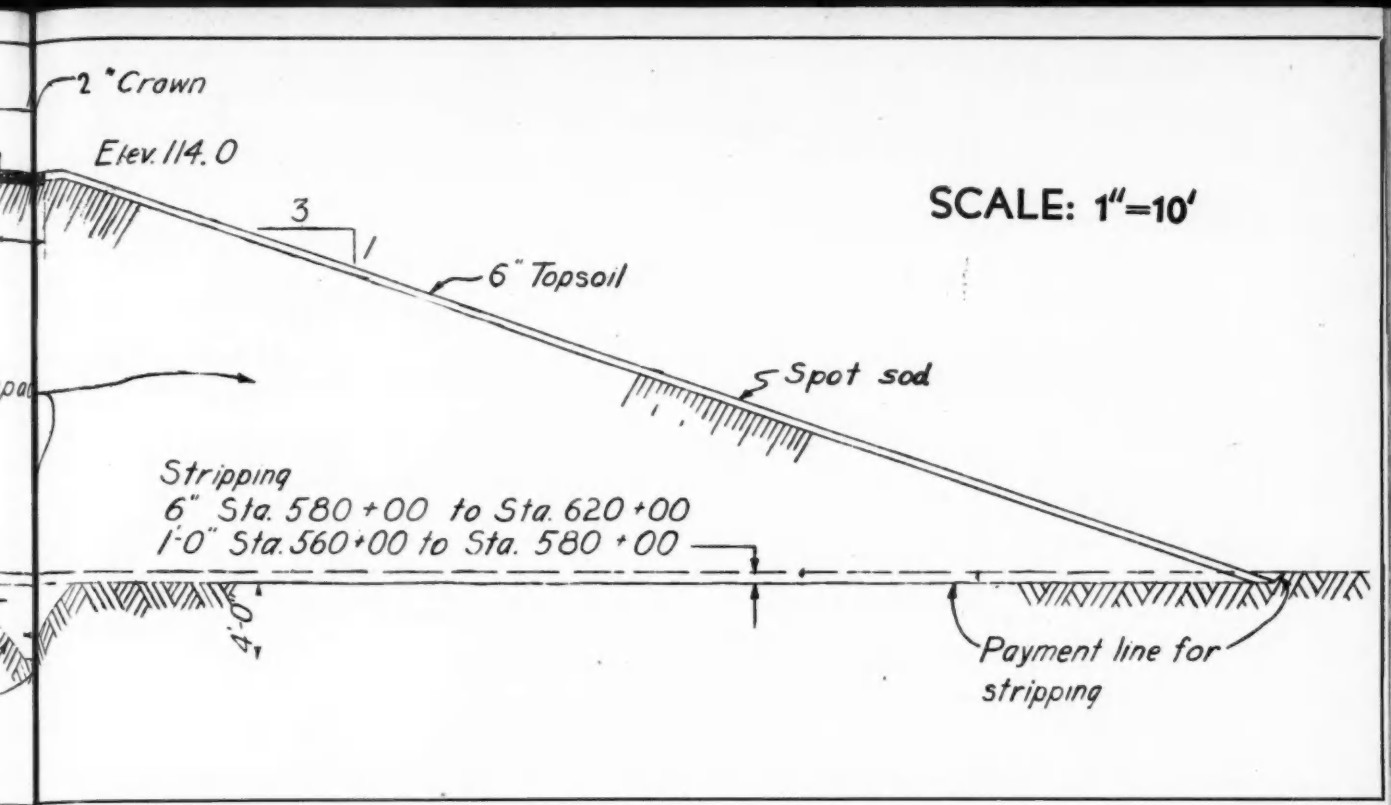
By CHARLES N. TUNNELL

THE FIRST STEP IN flood control protection for Harris County, Texas, is the construction of Barker Dam, which involves approximately $1,750,000 in the program that calls for a total expenditure of $32,000,000. This project was partially completed in the latter part of March, 1943, by the Macco Construction Company. The entire Barker Dam plan was not completed as per original plans, because of a stop order from the War Production Board to save critical materials.

The general program for the Harris County Flood Control includes the erection of three dams and two canals. Barker Dam is the first unit. At some future date, Addicks Dam will be built north of Barker Dam, and northeast of Addicks Dam there will be constructed White Oak Dam with the North Canal diverting flood waters to the San Jacinto River. Southeast of Barker Dam the South Canal will carry flood waters into the bay in the vicinity of Morgan's Point.

Proper drainage and control of

• **Left: Spreading dirt on the Barker Dam embankment with a Caterpillar D-8 and LeTourneau bulldozer. Below: Barker Dam spillway to the outlet channel.**

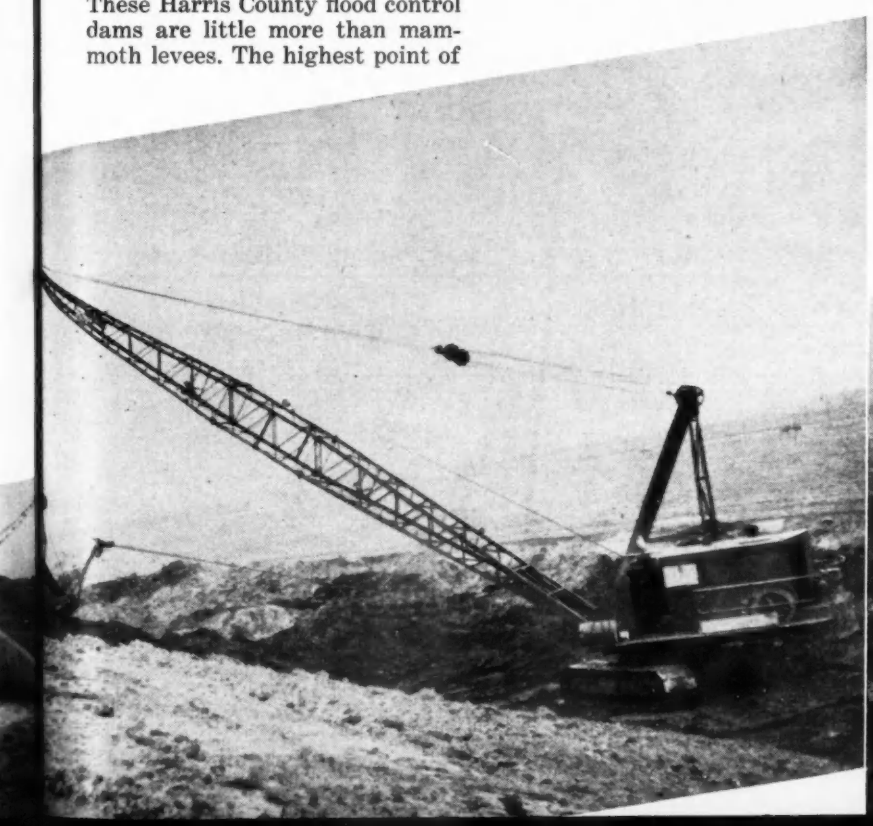


• This is a typical section of Barker Dam showing compacted fill and methods of treating slopes by spot sodding and using top soil.

flood waters for Harris County from the watershed to the west and north are the purposes of this flood control program. A small part of Barker Dam swings into Fort Bend County on the south. These Harris County flood control dams are little more than mammoth levees. The highest point of the Barker Dam is 35 feet, with the elevation for the general area of the Barker Dam at 91 feet above sea level. Both ends of the dam stop at elevation 107. The dam when completed will have a storage capacity of 136,000 acre-feet and will control a watershed of 153 square miles.

The Macco Construction Company started work on Barker Dam, February 2, 1942. The clearing of 1,736 acres was sub-contracted—along with 228 acres of grubbing—to Tips Engine Works. They used Jacques power saws, a five-foot circular saw, mounted on Farmall tractors driven from the power take-off on the tractor. This saw cleared brush and small trees up to four-inch size almost like mowing wheat. With larger trees, the saw first worked one side then switched to the opposite side and cleared rapidly.

The Barker Dam job was almost



• Left: Bucyrus-Erie dragline moving dirt from the borrow to the embankment. Below: Embankment and the Clodine ditch looking south from Bayou.

wholly a dirt-moving job, starting with stripping the embankment and borrow areas from six inches to one foot on an average, but from two to four feet in places to cope with localized conditions. The material from the borrows was moved with tractors, scrapers and draglines; then rolled and topped with six inches of black dirt and spot sodded with Bermuda grass, native to this section of southern Texas.

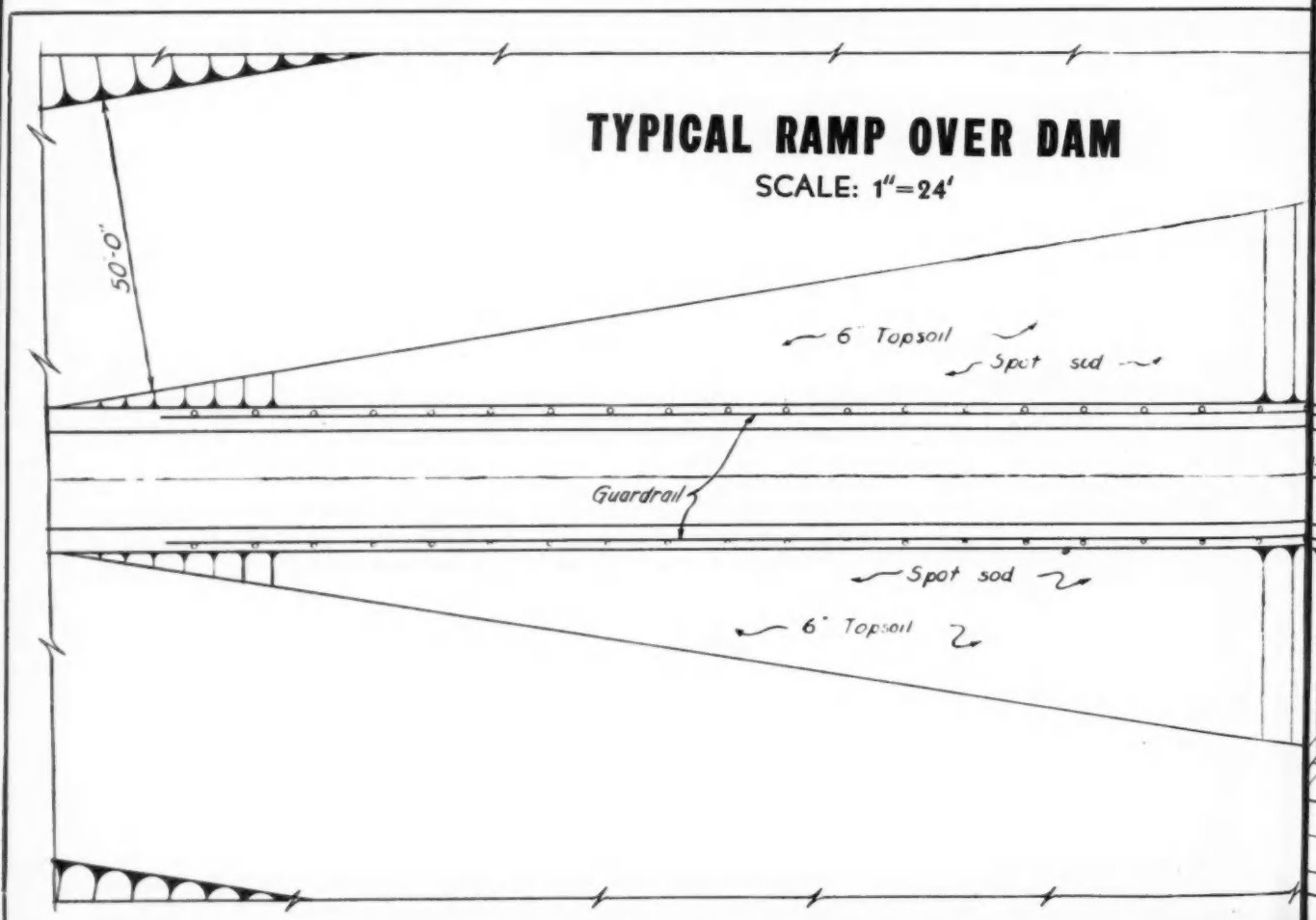
Stripping Operations

The stripping was done with two Northwest 80's, one with a 60-foot boom, the other with a 70-foot boom, both with 2½-yard buckets; and ten D-8 Caterpillar tractors; three 20-yard LeTourneau scrapers, and two 14-yard LeTourneau scrapers. Approximately two-thirds of the stripping was done with the tractors and scrapers, the other one-third was done with the draglines. The proposed length of Barker Dam as planned is 14 miles. Three miles of this dam have been finished with nine miles of the stripping completed and some work, such as the drainage ditch, completed for ten miles. Drainage ditches were dug in advance in order to make it possible to do most work in as dry soil as possible.

An inspection trench, eight feet at the bottom and 16 feet at top with four-foot depth was carried for eight miles. This trench not only served for inspection purposes to determine satisfactory foundation, but also as a core trench.

After stripping operations the drainage ditches on the backside of the embankment area were excavated and dirt cast onto the fill. These ditches were located 200 feet out from the centerline of the dam. On the opposite side of the dam, a 75-foot berm divides the dam from the borrows. The borrows range from 175 feet to 800 feet in width and lie adjacent to the embankment area, making it possible to take as much dirt as possible from the front side of the borrows, next to the dam, and as little as possible from the back side, just so drainage was maintained to the back of the borrow areas.

After stripping, two Bucyrus-Monighan draglines with 8-yard Hendrix buckets were used in the borrows and drain ditches to expedite the fill operation. These Monighans, both equipped with 150-foot booms, were supplemented with two Northwest 80 draglines and one Bucyrus-Erie 54-B dragline, all with 2½ cu. yd. buckets. Part of the dirt was handled to the fill with tractors and scrapers and after being cast in the embankment area it was spread and compacted to the 90% Procter density requirement with two D-8 dozers. After completing the embankment with a three to one side slope, with a 15-foot crest, the six-inch black dirt topping was made and followed with spot sodding, using four-inch squares on 18-inch centers. Eventually, a gravel topping, or road bed, will be placed on top of the dam, but this portion of the work



has been held in abeyance for the duration.

Numerous problems were encountered in this dirt handling operation. Although the Macco Construction Company, whose home office is at 815 Paramount Blvd., Clearwater, California, does all types of contracting jobs, mainly dirt handling, most such jobs have called for dry soil. On the Barker Dam project, the soil handled was mainly clay and so wet that seepage was a problem, and also at times sand areas were encountered. The soil contained from 16 to 30 per cent moisture. The three 20-yard and two 14-yard LeTourneau scrapers were supplemented with two Tournapulls which did not prove satisfactory because of the excessive moisture encountered. Much of the job had to be handled by dragline operation because of the wet condition of the soil. Another handicapping feature with the Caterpillars and Carryalls was the trouble encountered in getting repair parts. Some 15 new Caterpillar tractors and LeTourneau scrapers had been ordered with the expectation that they could be used on the Barker Dam project, but when the WPB freeze on such equipment came through the work had to be carried on with available equipment.

Maintenance Problem

"We naturally maintained the best repair shop possible on the project," says R. F. Cuthbert, Macco engineer on this job, "but the big problem in spite of an A-1-A priority for repairs was the fact that a unit had to be be down before parts could be obtained. We had several tractors down from one to five months that should have been in operation within a week's time had parts been available. In numerous instances we would have to rob parts from one tractor to keep another in operation. This necessarily delayed completing repairs on the tractor down."

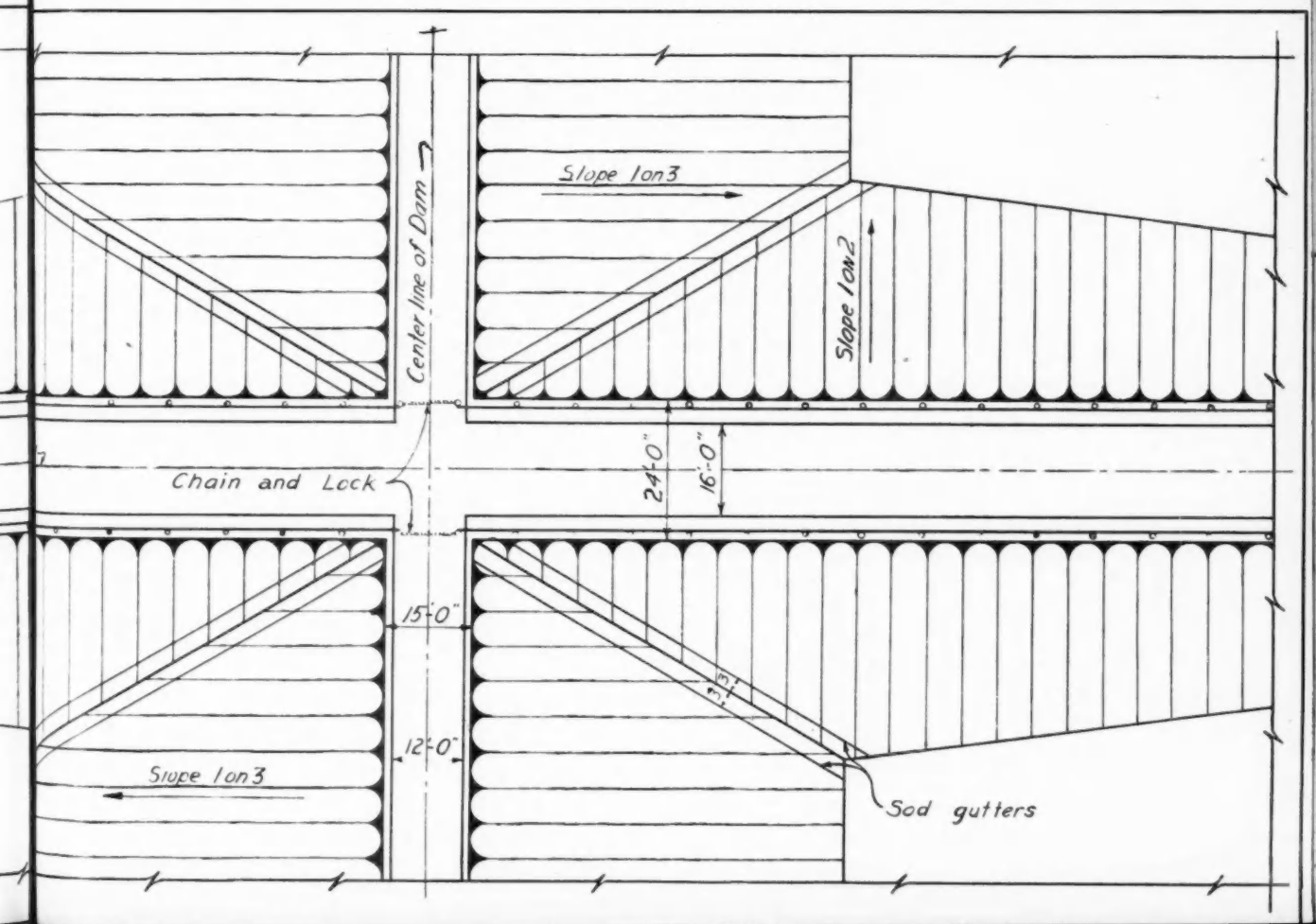
Fighting the maintenance problem and using much inexperienced labor, and faced with a shortage of even that type of labor, it was naturally a problem to keep a balanced outfit in operation.

"We used Pacific Wire Rope on all of our equipment. Regardless of brand, we try to select rope that is best suited for the operation."

Approximately 6,000 cubic yards of concrete were subcontracted to Wallace and Bowden. This work consisted of a spillway, box culvert type and stilling basin below, having five seven-foot by nine-foot openings with special gates on the center opening. Its capacity is 8,000 cfs. The original plans called for four steel bridges with concrete decks, however, these were later changed to concrete box culverts.

Granite riprap from Marble Falls, Texas, was used for lining the entrance and outlet channels of the spillway, approximately 2,200 cubic yards of riprap being utilized. The spillway leads to the rectification channel, or outlet channel, which extends three miles downstream. The first half of the channel distance has a 20

(*Continued on page 258*)



• The Trans-Isthmian road occasionally passes native thatched huts that previously had not even been near a trail in the jungle.

Trans-Isthmian Highway

Mud from torrential rains—deep cuts and big fills—hog-back ridges and saw-tooth peaks—jungles—all combine to make grading difficult over the final 25-mile stretch of road from Madden Dam to Colon and France Field completed at a cost of $4,000,000

By E. G. VICKERS

DURING THE YEARS since the completion of the Panama Canal in 1914, there has been a continual increasing public demand for a highway across the Isthmus. On the thesis that the jungle was the best defense for the Canal there was objection to the highway until General Clarence Edwards, first military commander of the Canal Zone, demonstrated that jungle could not restrain marching troops if the proper woodsmen preceded them.

Following disapproval of the military objection to the road the Panama Railroad objected on the grounds that it would create competition. So, time passed without a highway between the Atlantic and the Pacific more modern than the old gold trail that joined Porto Bello and Panama in the days of Morgan the buccaneer.

The original construction of the railroad, which was started in 1849, was very costly in both lives and money. The story is that there is a Chinaman buried under every tie. This high cost is probably the chief reason for delay in the highway's construction. The part of the highway that could be constructed wholly within the Canal Zone under the jurisdiction of the United States was built, the second important section having been finished at a cost of $100,000 a mile at the time the Madden Dam was being constructed.

After the treaty of 1937 with Panama, the United States undertook to construct a highway from Cativa to Madden Dam, all in the Republic of Panama, along a line covered with dense tropical growth and through an area that topographically presents extreme difficulties from an engineering point of view. This was the remainder of the Trans-Isthmian highway that now connects the Atlantic and Pacific oceans.

The section completing the Trans-Isthmian Highway, engineered and built by the United States Public Roads Administration at a cost of approximately four million dollars, is 25 miles long and connects Colon and France Field on the Atlantic coast of the Isthmus with Madden Dam, which is about half-way across the Isthmus and on the southeast side of the Panama Canal. A modern paved road already existed from Madden Dam to Panama City and Balboa on the Pacific coast, a distance of 26 miles.

Grading operations were started in January, 1941, near France Field at Randolph Road. Work on grading, as well as paving, kept on 24 hours a day and followed immediately behind the clearing crews, which broke the first way through the heavy tangle of tropical vines and underbrush between towering trees.

Grading Difficult

Torrential rains occurring frequently made progress for all types of grading equipment extremely difficult over the entire stretch of the Trans-Isthmian Highway, which wound and curved through the dense tropical jungle and over the series of hog-back ridges and saw-tooth peaks. Cuts in many places on the project exceeded 120 feet and the maximum cut depth was 137 feet. The fills averaged the same and occasionally ran higher than 130 feet. After tractor trails were first pushed through the jungle, over which necessary supplies could be hauled, the next step was removal of trees and debris from the right-of-way.

American operators were used on all grading equipment. After clearing, operations were carried on in about the same manner as in the United States. Mud was always a detriment to progress and extremely hard on all types of grading equipment in use. Scrapers with single over-sized tires, such as the Bucyrus-Erie S-112, were found to have a distinct advantage over scrapers with the standard rear dual tires. Bucyrus-Erie and Slusser-McLean 12-yard scrapers behind FD Cletracs were used to open the cuts and take them down until a semi-hard rock, which frequently occurred in all cuts, was encountered. Drill steel

often stuck in the porous wet rock, and slowed up drilling operations. Ingersoll-Rand wagon drills on Gardner-Denver compressors were used. Gardner-Denver and Black and Decker equipment was used to fabricate and repair drill steel. Due to the large amount of rock on the job, cutting edges on scraper and dozer equipment were short-lived.

After blasting, the rock was picked up by Marion and Link-Belt Speeder shovels and hauled to the fill with Koehring W-60 Dumptors and Linn Half-Trac dump trucks. Lorain 40 draglines and Coleman Quickway Motor cranes were used to clean up the slides, which frequently and unsuspectedly occurred in the deeper cuts. Buckeye Uni-Tilt dozers mounted on Cletracs were used in clearing operations and handling of rock. Six-yard scrapers behind HD-10 Allis-Chalmers tractors were used on clean-up work. Maximum loading of scrapers was seldom possible in the heavy soil, which was muddy from December until through June due to daily rains, and loading averaged 70 per cent for the entire Trans-Isthmian job.

All professional, supervisory and skilled workmen were from the United States and unskilled labor was made up of Panamanians, Colombians, Costa Ricans and other Central Americans. The number of men on the job averaged in excess of 1,000. The men from the United States found it hard to accustom themselves to the humid, low altitude climate and many were unable to stick it out on the Isthmus over six weeks. There were many new faces on the job every week.

Living Conditions in Camps

Mosquitoes were a constant pest. Wide tracks of jungle were cleared and burned at camp sites for the road crews and pools and streams about the area were oiled to kill off and prevent breeding of mosquitoes. Buildings, where men ate and slept, were carefully screened and caulked to make them mosquito proof. Malaria and venomous jungle snakes were not as much a cause of worry as labor trouble. Blackout conditions at camp sites and repair shops existed at all times after December 7, 1941.

Mr. John L. Humbard, chief engineer for the United States Public Roads Administration, possessing unusual energetic qualities, found time to break away from his administrative duties and be on the scene of road building operations almost every day. Tom Higgs, assistant to the chief engineer, was on the job all of the time, keeping equipment rolling at top speed and fighting the many troubles which are always on hand in the tropics, especially when so vital a job is being pushed through at top speed. Baxter Vickers, superintendent of construction, and Jim Black, superintendent of equipment and maintenance, were other key men on this project.

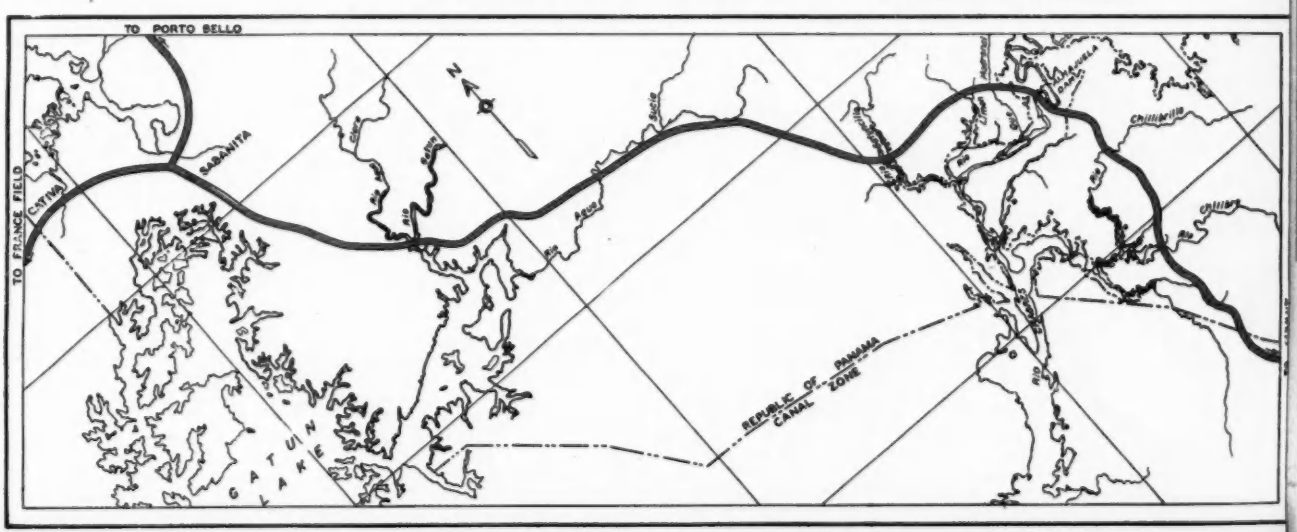
The first concrete on the Trans-Isthmian Highway was poured January 10, 1942, just a year after the first excavation and grading began, and paving of both lanes on the Atlantic side sector, from France Field to Camp Rio Gatun, was completed March 13, 1942. Paving equipment was then moved to the Pacific side where paving operations were started from the

• View of the highway with one of the two ten-foot slabs of concrete poured.

Madden Dam end and one strip of concrete was laid to meet that from the Atlantic side to Rio Gatun. This was completed on April 21, 1942, when a full battalion of mechanized infantry in nine-ton Half-Trac trucks, at an easy pace, drove from the Pacific coast to the Atlantic over the Trans-Isthmian under complete blackout conditions in less than three hours. (Note: The same movement via railway, the only means of land transportation a few weeks earlier, would have taken 24 hours.) On May 8, 1942, one 10-foot strip of concrete was complete from Madden Dam to the Atlantic side, Randolph Road, and paving of the second strip was complete with the exception of eight miles on the Pacific side.

Aggregates were produced at Camp Rio Gatun, where the Gatun River enters Gatun Lake, and also at a point a mile below Madden Dam on the Chagres River. Concrete mixtures were dry batched from near the source of aggregates to a short distance from the

• Connecting France Field on the Atlantic with Madden Dam, about half-way across the isthmus, the highway skirts Gatun Lake on the north and is located in the Republic of Panama for the most part.



• After crossing the Rio Gatun on a bridge built over this sub-structure the road quickly disappears in the jungle. All sub-structures for the 12 bridges were constructed by the Public Roads Administration and super-structures were built by the American Bridge Company.

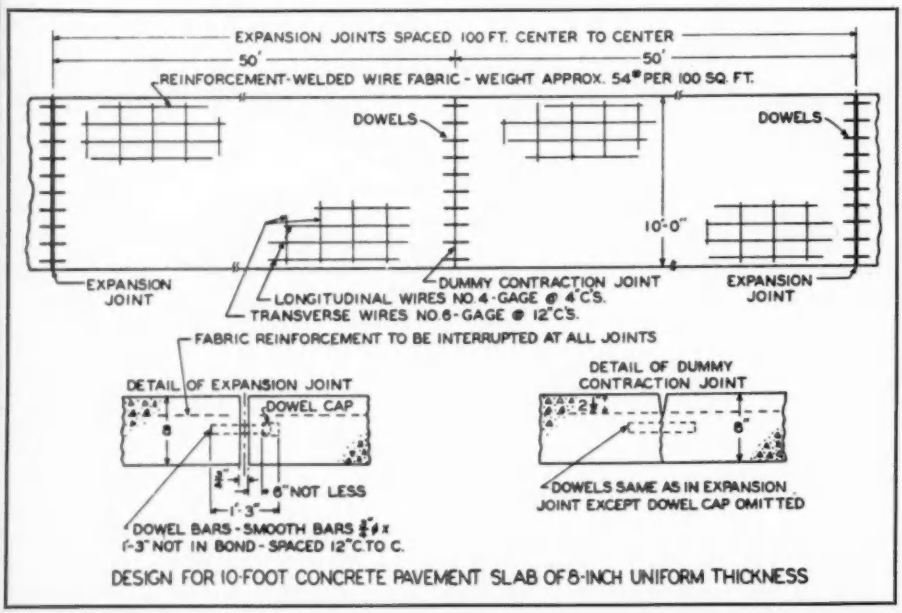
paving operations, where cement sacks were slit open and a manually operated turn-table turned trucks so they could be backed into the 34-E Twin-Batch Koehring Paver's skip to dump. Novo-Pumps forced water from nearby streams to the paver. A Galion roller and Buckeye fine graders moved along ahead of the paver, and rolling along the screeds behind the paver, Blaw-Knox and Jaeger finishing machines put the last touches to the 8-inch slab. Mack and White three and five-ton trucks with Anthony double batch dump bodies were used to dry batch materials to the paver. These were at time supplemented by Ford and Chevrolet dump trucks borrowed from the United States Army and Panama Canal Engineering Department.

The four-foot section between the two 10-foot slabs was filled with a pea gravel, but was not treated with asphalt emulsion as previously intended, due to shortage of this material. Seven-foot shoulders on the outside of the slabs were given a stabilization course. Stabilization of shoulder rounding on the Trans-Isthmian was accomplished with sod and gravel, and embankment sides were strip sodded throughout the rainy season.

Working time was often lost due to torrential rains occuring along the entire road, but chiefly in the center portion, where the road crossed the Rio Gatun and Agua Sucid Rivers. Lack of consistency in the red soil peculiar to this region caused it to slide so easily that after heavy downpours it was not unusual to find the recently paved road covered with soil to a depth of 15 feet in cuts and buckling and slipping of the slab on the deep fills, necessitating refilling, riprapping and repaving.

All of the six major and six minor bridges on the Atlantic side were complete at the end of May. On the Pacific end, a bridge was built as a by-pass over the Chargres River, a mile below the Madden Dam. The bridge was completed in September, 1942.

As grading operations came to a close on the Trans-Isthmian Highway, the grade equipment was moved onto a 25-mile project which was to serve as an auxiliary road to the existing paved road from Panama City to Madden Dam. This route was also over semi-mountainous country and entirely in the Republic of Panama, except for a few short distances where it entered the Canal Zone. The road from Madden Dam to Panama City in some places paralleled the old Cruces Trail, which was the only other road ever to cross the Isthmus. The Cruces was a crude trail, cobblestoned in places, built in the Spanish era, and is now overgrown and almost completely obliterated. Work on this project was also carried on 24 hours a day with a series of portable Novo-Plants lighting up the work on the 160-foot right-of-way between the high green jungle walls.



DESIGN FOR 10-FOOT CONCRETE PAVEMENT SLAB OF 8-INCH UNIFORM THICKNESS

Numerous Side Roads

As completion of the Trans-Isthmian route and P-8 auxiliary road progressed, the United States Army graded and surfaced numerous truck roads from it to anti-aircraft searchlight and other strategic defense positions.

Grading, graveling and bridges on the auxiliary projects from Madden Dam to Panama City were completed during December, 1942, at which time all men and equipment, except that necessary for a small maintenance crew, were transferred to a section of the Pan-American Highway in Costa Rica.

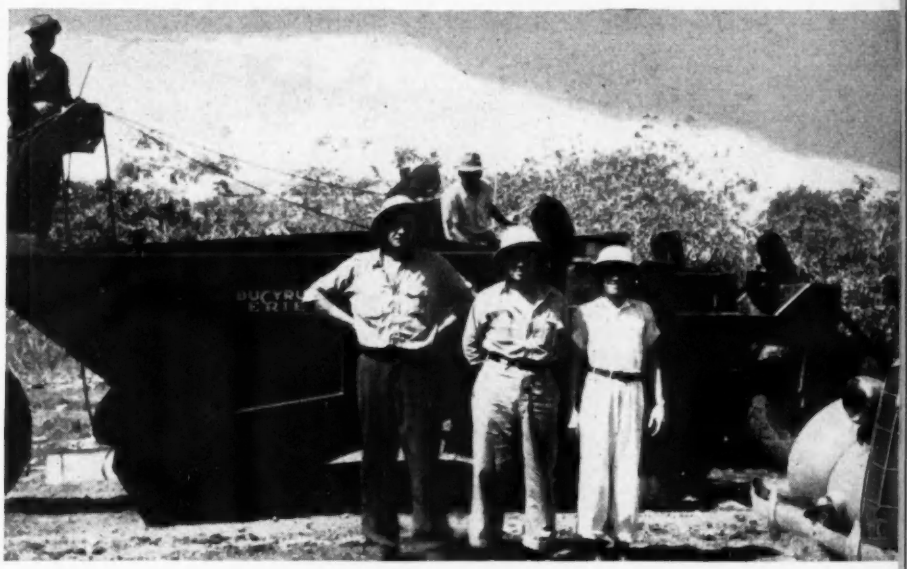
In the rush to complete work

on this project under excessive hardships, and to open the road to our military forces in the particularly hot-spot of the western hemisphere, figures on quantities on dirt work and other departments of the construction did not keep pace with production. Many interesting facts in connection with the building of this road cannot be mentioned for defense reasons.

Ultimately, the Trans-Isthmian road will be a divided highway, but with no attempt to parallelism of either alignment or grade. One side will carry traffic toward the Pacific, the other toward the Atlantic. Each side will constitute virtually an independent highway, 20 feet wide with 10-foot shoulders. The surface will be of 8-inch reinforced concrete. Bridges will be of deck type 26 feet wide and independent structures will be used for travel in each direction. This will permit a practically independent location for the second half of the highway when it is built. If the bridges were widened with the intention of using them ultimately for two-way traffic they would constitute control points which would make location of the second half of the road exceedingly difficult, if not altogether impractical in view of the roughness of the terrain.

The Pacific-bound section has been completed, and until completion of the Atlantic bound half, will operate as a two-way road with 10-foot lanes. The maximum plus-grade toward the Pacific was planned at five per cent—which will be uphill for ultimate traffic. The maximum plus-grade toward the Atlantic will be six per cent not to exceed 400 feet of seven per cent grade. On the second half of the road, ultimately to carry Atlantic-bound traffic, these grades will be reversed, except that downhill grade toward the Atlantic may then freely be made seven per cent.

This specification will give the completed highway a five per cent maximum grade in the direction of traffic, and at the same time greatly reduce the quantities of earth work by giving the engineer the advantage of a heavier gradient in one direction. This plan will greatly facilitate getting a satisfactory line through the conglomeration of hills that comprise the topography.



• **Top: Native mechanic reeves cable on a new 10-yard (struck) scraper just delivered on the job. Center: More new equipment for the Trans-Isthmian road. Note corrugated iron culvert pipe in background which was formed on the job. Bottom: Moving out machine parts and supplies to a new location farther down the road as work progressed.**

Vital Link of the Americas

Construction and improvements speeded on Pan-American Highway system as wartime need for overland transportation in the Western Hemisphere grows more acute

By EDWIN W. JAMES

WARTIME NEED FOR overland transportation in the Western Hemisphere quickens the progress on highway links between the Americas. This acceleration of road building, where military strategy of defense and supply demands it, has resulted in increasing the importance of the Pan-American highway as a potential factor, not only in the "Battle of Supply Lines" but also in the "Battle for Raw Materials" so essential to our increased war production. The shipping shortage, U-boat attacks on vessels plying inter-American trade routes and defense objectives hasten the realization of these continuous overland communications between North and Central and South America.

The 1600-mile Alcan Highway from Canada into Alaska and an international bridge across the Suchiate river, at the Mexico-Guatemala border for overland communications from the United States into Central America by way of Mexico were rush-job projects illustrating the wartime need for speed.

The Inter-American Highway is an integral part of the Pan-American Highway—it is that section of this great hemisphere link between the United States-Mexican border and the South American hemisphere—and holds out promise of the day not too far distant when we may see a continuous overland artery of highways linking two great bastians of hemisphere defense, Alaska and the Panama Canal. Roughly, this is a distance of 8,000 miles. The joining of these distant points by highways will represent one of the most spectacular road-building feats in history.

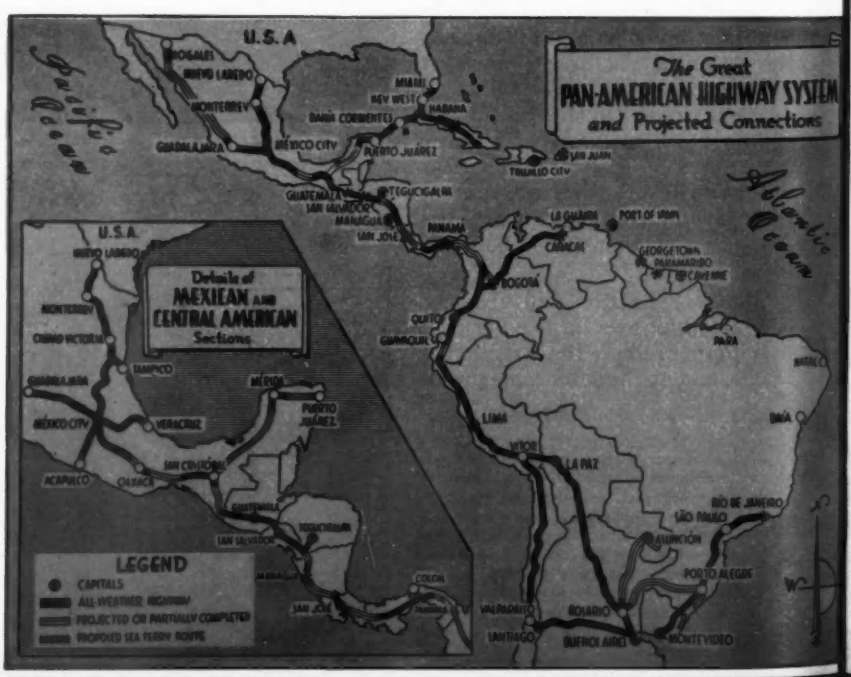
The Pan-American Highway system has been under construction for almost 19 years. When it is completed nearly half a billion dollars will have been expended on it. Construction and improvements of this highway system are continuing today throughout the Americas.

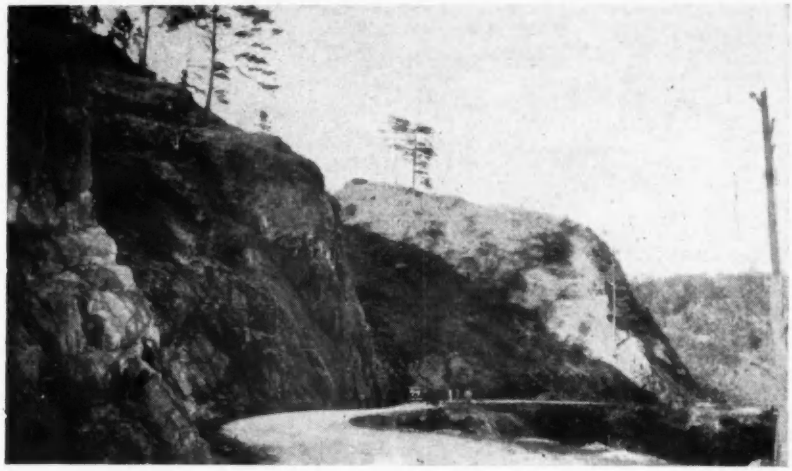
For the internal movement of materials in South America there already exists various railroad, air and river shipping facilities. Others, proposed or are under construction, can be coordinated with the Pan-American Highway. The course of the highway has been strategically laid out so that there are now convenient connections with other forms of transportation.

Right now the question is—Can the Pan-American Highway provide a major contribution to the war effort in the immediate future? Or must we wait until every mile of highway is paved from the United States-Mexican border south to Chile and Argentina; Can the Pan-American Highway be utilized to bring strategic materials from the other American republics to the United States? Can the Pan-American Highway lessen the pressure on and destruction of shipping? The answer is an unquestionable affirmative, under certain concomitant conditions.

Important Part in World Crisis

The use of highway transportation has figured very prominently in this world crisis. Our government has recognized the importance of highway transportation for the movement of materials by granting large loans and appropriations to the other American republics, totaling between 85 and 95 millions of dollars, for the building of the Pan-American Highway through Central and South America. The same objectives are involved in the recent decisions to rush a "pioneer road" from the Mexican-Guatemalan border to Panama City to be linked by June, 1943, with the Mexican railway system leading north to the United States border, and to rush to completion the Canadian-Alaskan Highway to make it available for motor transportation for defensive as well as offensive operations. But even these loans and appropriations





• Some of the heavy excavation work necessary is indicated by banks on a section of the Inter-American highway south of Tegucigalpa, Honduras.

may be inadequate if we want speedier construction.

Now, with the ending of the rainy season, it is practical to expedite work on the unconstructed sections of the Inter-American Highway in Central America, part of the Pan-American system. Excluding portions of the Inter-American Highway through southern Mexico, the schedules call for completion of emergency work by next June. Funds have been provided for the work. Central American republics are cooperating with the United States in speeding construction of the remaining links. Under the spur of wartime requirements, we may see the Inter-American Highway in use as a continuous overland artery long ahead of what many of us expected before Pearl Harbor.

Mexico, too, is extending her highway network. In 1941 Mexico obtained $30,000,000 in credits from the Export-Import Bank of Washington to aid in completing construction of the southern end of the Inter-American Highway in Mexico. The road has been completed from the United States border to a point about 150 miles south of Mexico City. Still there is a good deal of construction remaining to be done in southern Mexico. At this time completion of the Mexican links to join the Central American system cannot be forecast. Nevertheless, construction of the Inter-American Highway gathers momentum.

Congress Authorizes Funds

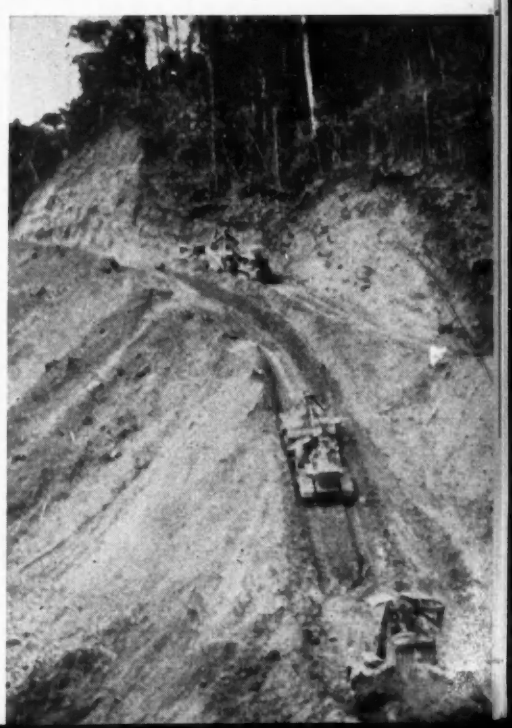
For the acceleration of the highway through Central America, the Congress of the United States has authorized $20,000,000. This is to be matched with $10,000,000 by the Central American republics, in a ratio of $1 for each $2 contributed by the United States. Central American countries have accepted this cooperative arrangement. In addition, $15,000,000 of United States funds have been allocated by the War Department for completion of a pioneer road to complete the unconstructed sections in Central America.

Road building in Central America has been pushed forward actively. In Panama road projects totalling more than $10,000,000 are nearing completion. Nicaragua has spent about $2,000,000 on new roads and is about to start on a $4,000,000 project to provide connections with the Atlantic seaboard. In Honduras, El Salvador and Costa Rica, available funds for connecting roads total more than $2,000,000.

Today, road building in Central America serves more than an immediate strategic defense purpose. Central American economy has been dependent in large part upon exports of bananas, coffee and other commodities. Export markets have been curtailed or eliminated by scarcity of shipping. New road building is a handy outlet for displaced workers. In Honduras thousands of banana workers were left idle by cessation of banana exports. To provide emergency employment and at the same time improve highway transportation, the United States made funds available for the rebuilding of a section of the highway from Potrerillos to Tegucigalpa, the capital of Honduras.

In Central America, as in much of the other Americas, trade in the past has been conducted in large measure by sea and waterway transportation to distant markets. The mountain ranges which march in virtually uninterrupted procession through Mexico and Central America down the west side of South America have encouraged trade to follow the lines of least resistance along inland waterways, oceans, the Caribbean Sea and the Gulf of Mexico. The economies of Central America, like those of South America, have been tied into the world market. Central America's chief market has been the United States. In turn, Central America has depended mainly upon the United States for manufactured goods and in some places also for food.

Highways should improve internal trade in Central American countries and lessen their economic dependence upon overseas communications. In wartime, greater self-sufficiency in providing food



• Road construction on portion of Inter-American highway at San Jose, Costa Rica.

and other necessities must be attained. The Central American countries realize this. So do United States authorities familiar with the wartime economic problems of the other Americas. From this mutual understanding of common problems results cooperative efforts to help tide Central America over wartime supply problems. The road project in Honduras is an example of such cooperation.

Fortunately, the greatest of the projects under way in Central America was conceived and well advanced when the war reached inter-American trade lines and ships were diverted from carrying bananas, coffee, sugar and other tropical staples to war tasks. From the Rio Grande south to the Panama Canal three-fifths, or nearly 2,000 miles, of the Inter-American Highway was paved or suitable for all-weather travel in unconnected sections. But there remains a number of gaps. To close these gaps quickly, construction of a "pioneer" road is scheduled for completion by next summer. Approved plans for these links call for the building of about 625 miles of all-weather road to join with more than 925 miles of surfaced highways already extending south from the Guatemala-Mexico border to the Panama Canal. The completed system will connect with the 50-mile east-west Trans-Isthmian Highway paralleling the Panama Canal. The Isthmian Highway is already open to wartime traffic.

• Edwin Worley James, author of this article, as chief of the Inter-American regional office of the U. S. Public Roads Administration, is in direct charge of U. S. activities in connection with the completion of the Pan-American highway.

Pioneer Road Specifications

Pioneer road specifications call for a roadbed 10 to 16 feed wide and an eight-inch gravel surface. Maximum grades of 10 feet and maximum curvature of 100 feet are allowed. The road follows for the most part the long-projected route of the Inter-American Highway running south toward ultimate connection with the main Pan-American Highway System in South America. The last 300-mile link between Central and South America perhaps must await the post-war period.

The pioneer road, in conjunction with existing highways and railroads, should be useful for moving food and strategic materials to markets and shipping centers. In Panama, for instance, there is a food problem because of the concentration of defense forces there and the shipping bottleneck. Yet near-by Costa Rica is a potential source of additional food. In recognition of this, the United States has entered into an agreement with Costa Rica for increased production of foodstuffs, such as vegetables and dairy products. Highways will facilitate the movement of this food and local self-sufficiency in wartime.

Similarly, the pioneer road should improve internal trade and raise living standards in sections of Central America now handicapped by lack of transportation. Whether United States consumers can expect any appreciable volume of coffee by way of the overland transportation system cannot be predicted now.

The pioneer road should provide next year continuous overland transportation from the Panama Canal, linking with the railroads of El Salvador, Guatemala and Mexico. Trucks on the highways could carry coffee as well as other commodities to shipping points. Nevertheless, it must be understood that the Mexican railways will be heavily laden with strategic materials for United States industry. Presumably these strategic materials will get precedence for rail capacity, just as they do for cargo space on ocean routes.

The Inter-American Highway, as a central artery of overland transport, may provide an avenue for the movement of many things north and south, including some coffee. El Salvador, Honduras, Guatemala, Costa Rica and Nicaragua have been substantial coffee suppliers for the United States market. They, with Mexico, will be the only coffee producers with overland connections to the United States market.

Still we cannot expect the Inter-American Highway to rescue United States consumers from

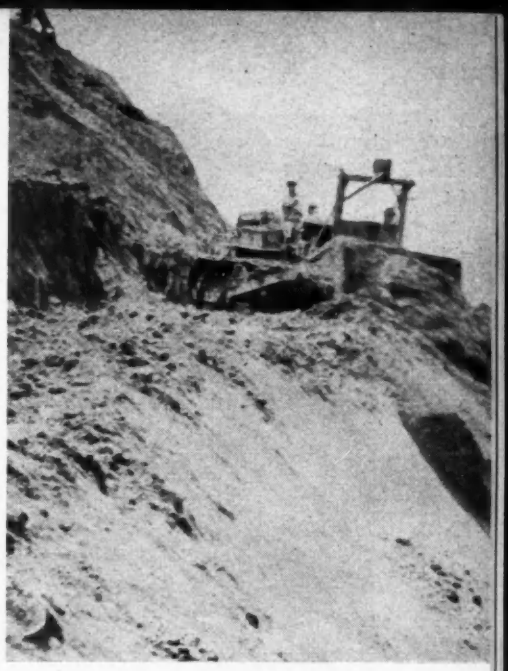
• Modern road building equipment is originally purchased by the Colombian government and rented to local contractors.

coffee rationing. On the contrary, it must be emphasized that Mexico and Central America also are readjusting to war tasks. They are our staunch allies in war. Mexico is increasing production of metals to supply United States war industry. Central American producers are preparing to grow abaca, source of manila hemp, and other tropical materials to replace supplies formerly obtained outside the Western Hemisphere. Better roads will aid conversion of production to strategic materials. At the same time, the railways in neighboring republics, like those in the United States, are handling a large part of the freight and passenger load shifted from ocean vessels and automobiles since Pearl Harbor. Yet, even if we do not get any appreciable inflow of coffee by the overland route, this is far overshadowed by the strategic value of the new roads.

As Lure to Tourist Travel

When victory is won in this world-struggle, and the Axis threat to the Americas is removed, we may then consider the Inter-American Highway in its more normal aspects and promise. When the Pan-American Highway system was conceived and started 19 years ago, one of its great attractions was the prospect it afforded for tourist travel between the Americas. We saw the lure of such travel when the highway from the United States to Mexico City was completed.

This tourist travel was an effective method of making good neighbors acquainted with one another. Many people in the United States caught their first glimpse of our neighbors to the south on a motor jaunt across the border into Mexico. Tourist travel is handicapped now by gasoline rationing in the United States, difficulty of obtaining tires, the need for conserving cars. After the war the tourist urge will revive. So every mile of new inter-American roadway will be useful when the peoples of the Americas resume peacetime travel. The highways should become one of the strongest bonds uniting the American republics in fraternity and good neighborly interchange of trade, culture and ideals.



• Bullgrader at removal work on large slide in Costa Rica section of highway.

The construction of these roads present formidable physical obstacles. The roads must climb mountain peaks, cross many rivers and wind through some of the most rugged country in the world. But American road builders have shown themselves equal to the task. Engineers and workers in other Americas, as in the United States, readily take to road building. The record-breaking speed of construction of the highway to Alaska adds another testimonial to the roadbuilding genius of the Western Hemisphere peoples. When the Inter-American Highway and later the remaining links of the Pan-American Highway system to South America are finished, we shall have new monuments to the roadbuilding skill and fraternal amity of the Americas.

China's Burma Road

The wisdom of a planned international highway system as a basic part of our war program has been dramatically exemplified by China's Burma Road. Scooped out in ten months by the back-breaking hand labor of more than 100,000 men, women and children, this highway functioned for almost five years, pouring new life blood into the armies of China. Observers who have compared the Burma Road with finished sections of the Pan-American Highway, such as those in Peru and other American republics, rate the Burma Road as a back-country, grade D highway. Yet, in 1941 the Burma Road managed to provide 20,000 tons of vital military and hospital supplies every month for the fighting Chinese armies.

When the Burma Road was first opened in 1937 its capacity was limited to about 5,000 tons a month. Despite lack of machinery and equipment, lack of organization, technical difficulties, lack of fuel, inadequate surfacing and an unremitting rain of Japanese bombs, this artery continued to function until Burma was conquered by the enemy. Chinese humorists' favorite jibe at the Japanese was that a Jap bomb cost a thousand dollars—the hole it made in the road cost eight cents to repair. Today the Chinese are building another highway to connect China's stronghold, Chungking, with India.

Over the Burma Road moved strategic materials such as tin, antimony, tungsten, wolfram, lead, quicksilver, tung oil, mica, acids and T.N.T. Other items reported to have been trucked over the Burma Road included heavy and bulky materials such as iron, steel, railway parts, ship-building parts and copper. Reports indicated that a large percentage of the truckloads consisted of fuel—there being few sources of gasoline supply on the road. Such trucking of fuel would not be necessary along the Pan-American Highway System. Some fuel facilities are now available and gasoline depots could be established. Also, there are a large number of Diesel-motored trucks in South America requiring considerably less fuel that might be used.

The supplies that were routed to the valiant Russian armies from the port of Murmansk and then were shipped southward from that city by truck and rail, helped Russia to weather the first terrific onslaught of the Nazi war machine. In the Middle Eastern theater of war a combination of long-distance truck hauling over highways combined with rail and

• Compacting a fill on the Trans-Isthmian highway.

water shipping is now being utilized to bring in supplies to bolster the Russian effort to hold the Caucasus oil region, thus further proving the necessity and feasibility of coordinated rail, ship and long-distance trucking under the impetus of military or strategic exigencies.

The "Fighting French," too, built new highways, one about 1,700 and the other about 1,900 miles long, through French Equatorial Africa for the transportation of supplies for the Near East front, under very difficult conditions and at high costs. These highways enabled the "Fighting French" to attack the Italians in southern Libya.

In each of these instances, highway transportation proved to be successful and indispensable.

Present Transportation Situation

Ships still are the principal means of moving commodities in inter-American trade. Since Pearl Harbor, published reports indicate sinkings of more than 500 ships and the damaging of many others in Western Hemisphere waters. So acute is the situation that, except for air transport and cable communication, we face the threat of being cut off from the other American republics unless the present trend can be reversed. It is a terrific attack and possibly the most successful Nazi war operation of 1942. Nothing approaching such dislocation in the nation's sea traffic has been experienced since the War of 1812.

Indeed, so serious is the problem that radically new ideas are being developed or are under consideration to cope with the submarine menace. Construction of a new type of ship, the so-called "sea otter," and of huge cargo-carrying planes has been considered. Recently the government announced a $10,000,000 program designed to acquire an emergency fleet of existing sailing vessels and indicated its intention to build others in the other American republics. However, no reduction of the long sea distance to be traversed will result. Therein is the crux of the inter-American transportation problem. It is the long sea distance which makes this menace to our shipping so critical. If transportation between the Americas over the long sea routes can be sharply reduced, and if at the same time a continuous flow of essential supplies can be maintained, we are on the way to a solution of the problem.

United States shipyards are working at top speed turning out vessels in record time. Production perhaps is running neck and neck with the number of United Nations' ships being destroyed and damaged by the Axis. Recently, Rear Admiral Emory S. Land, Chairman of the Maritime Commission warned that, "we can't lick the submarine menace, though we may be able to ameliorate it." However, even if shipbuilding equalled sinkings it would not necessarily relieve the situation. Balancing the books is not enough.

Our war output is impotent unless we can transport munitions and other supplies thousands of miles to the fighting fronts. We hear about our great production efforts—the excellent training of our Army and Navy and air forces —but between them stands the problem of logistics—that branch of military science dealing with the moving, quartering and provisioning of armies. Ships to carry men and supplies are our first necessity in opening a second front in Europe or striking with concentrated power at the enemy in any theater of war. If we are to control the shipping situation, bold measures will have to be taken to combat or circumvent the U-boat in the Battle of the Atlantic. British Prime Minister Churchill said recently, "without ships we cannot live, without them we cannot conquer."

Shipping distance from Buenos Aires, Argentina, to New York is 5,871 nautical miles, if ships follow the normal peacetime shipping lanes around the northeastern hump of Brazil, and then sail in a straight course in the general direction of Cape Hatteras and thence to New York. The usual freight ship passage during peacetime over this route requires 24 days and often more. A major portion of the trip is in the South and North Atlantic Ocean, where the incidence of ship sinkings has been highest, including sinkings of vessels of South and Central American registry. A part of the voyage from Trinidad north is made in secondary naval and aerial patrol zones. Through a greater part of the trip, ships do not have the primary protection of Army or Navy patrols except at the time ships are about to enter waters adjacent to ports of destination in the United States.

(Continued Next Month)

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Shots from the FIRING LINE

Raise Equipment Rental Rate Ceilings in Alaska

An increase of 25 per cent in the maximum rental rates for Alaskan construction and road maintenance equipment has been authorized by the Office of Price Administration. This action is expected to assure the leasing this Spring to Alaskan war projects of a considerable quantity of construction and road equipment which until now has been used in connection with mining operations, according to information received by OPA.

A study of overhaul and repair costs made by OPA indicates that the former ceiling rentals were sufficiently high to provide a margin over costs in domestic equipment, but were not adequate to cover the unusual costs incurred by Alaskan owners of equipment.

The survey shows that severe weather conditions and terrain, and the primitive housing and upkeep conditions prevailing while equipment is on the job, expose Alaskan equipment to greater wear and tear than is true for equipment used for similar work in the United States.

'Big Inch' Crosses 200-Mile Mark in 809 Mile March

Battling spring mud in the valleys and late snow in the mountains, construction crews on the 24-inch War Emergency Pipeline have crossed the 200-mile mark on the 809 mile march from Illinois to New York and Philadelphia, Petroleum Administrator for War Harold L. Ickes announced.

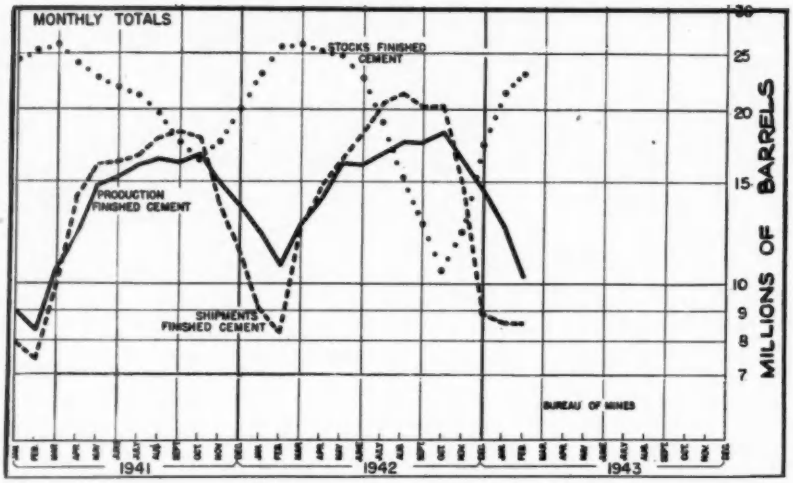
"Actual pipe-laying is now in progress on all of the seventeen working spreads into which the work has been divided, and with an even break on the weather during the next few weeks, the 'Big-Inch' will roll into its refinery terminals at New York and Philadelphia on schedule," he said.

According to reports from construction headquarters of War Emergency Pipelines, Inc., builders of the pipeline for the Government, heavy rainfall over the entire route of the eastern extension of the line has severely hampered recent operations. Numerous rivers as well as smaller streams have been at flood stage, making work on adjacent lands impossible.

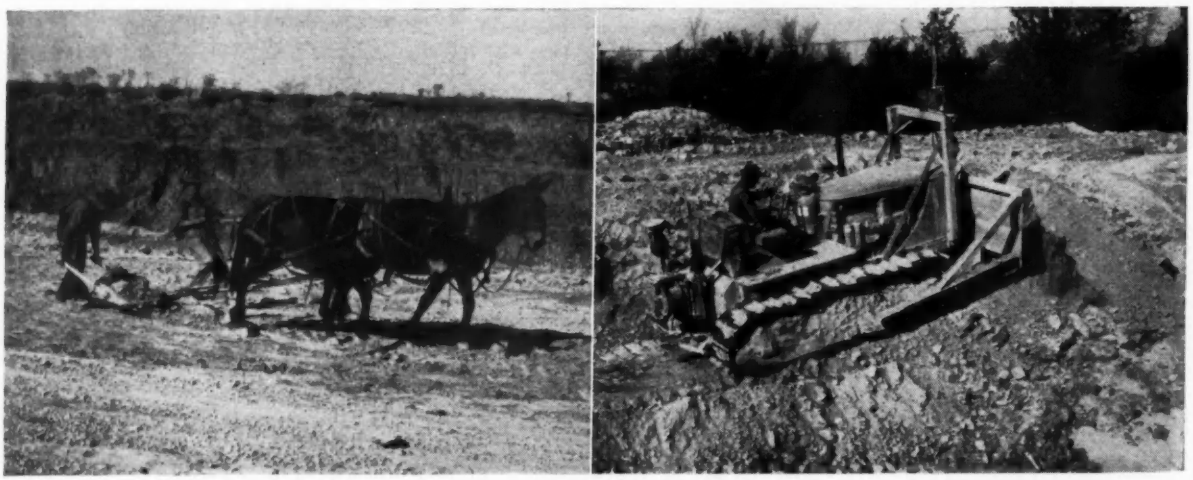
Despite winter weather difficulties that delayed the start of construction on several of the contract sections, current construction progress is satisfactory, according to Deputy Administrator Ralph K. Davies.

"Reports from the 'Big-Inch' working gangs are materially more encouraging now than they have been throughout the winter. Alternate storms and thaws along the route of the pipeline have created impossible working conditions for both workmen and machines for extended periods, but the construction pace is now advancing, and improved conditions along the right-of-way will soon make it possible for the construc-

Portland Cement Industry Trends — 1941-43



• In the earlier days of the company's history, before modern equipment was added, a slip-scraper like the one shown to the left, was used extensively by the LaClede Christy Clay Products Co. of St. Louis, Missouri, for removing overburden and clay from pockets throughout their mine near Wellsville, Missouri. To the right a LeTourneau bulldozer now helps strip and level the 35 to 40 feet of overburden from deposits of fire brick clay in the same mine.



Easy Pipe Spotting

Koehring Cranes can handle and lay pipe efficiently and safely... because of the Koehring accurate boom control. War construction projects require speed and safety. Hoisting the load, raising the boom while swinging saves seconds with every operation. Every move is a second-saver in handling material... waste motion is reduced to a minimum. All these time-saving advantages of Koehring mean greater speed on the job ...for greater production per hour.

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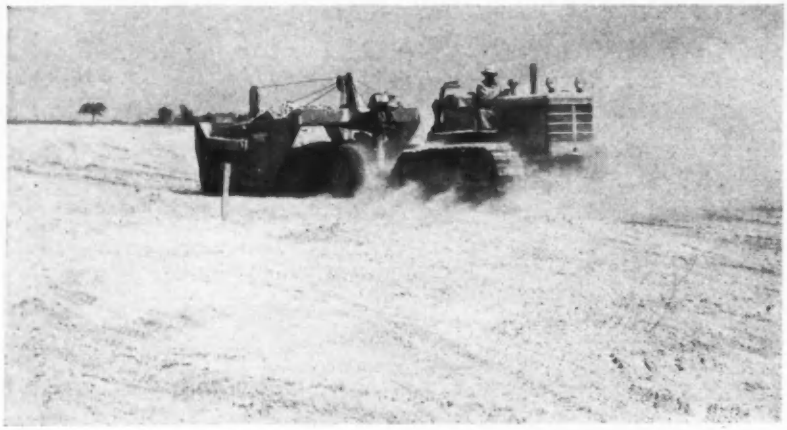
KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT



● Handling white loam on an airport grading project for the City of Bloomington, Indiana, is a dusty job for this International powered Bucyrus-Erie 4-wheel scraper.

tion gangs to 'catch-up' on much of the time lost during February and early March," Davies said.

The "Big-Inch" completion schedule calls for oil to be flowing into the eastern refineries and storage terminals by early summer. Capacity operation at a rate of 300,000 barrels a day is expected shortly after the start of full Texas-East Coast pumping operations. Twenty-five pump stations will drive a continuous stream of oil over the 1,340 mile route. Actual mileage of the pipeline, previously reported to be 1,385 miles, has been reduced during construction by an overall straightening of the route through the securing of more favorable right-of-way.

Now in operation between the Longview, Texas, and a temporary tank car trans-shipment terminal at Norris City, Illinois, the War Emergency Pipeline is already contributing markedly to the increasing overland flow of petroleum to the eastern seaboard.

Clean and Repair Levees

The commissioners of Mineral Marsh Drainage district will supervise the cleaning out and repairing of ditches and levees in Bureau and Henry counties, Illinois. It is expected that there will be 1,100,000 cubic yards of excavations in this cleaning and repairing.

Partially Lift Stop Order on Grand Coulee Construction

A stop-construction order halting work on the Grand Coulee Dam project was partially lifted by the War Production Board which authorized construction of a road to replace one which was inundated by high water in the Grand Coulee Reservoir.

Relocation of the road was stopped by the revocation order for Grand Coulee Dam. It was held to be essential in that it provides access to town for farmers who would otherwise be isolated. The road, known as the Lincoln County Road, extends south from Miles, Washington, for a distance of approximately 14 miles. A cost limitation of $366,000 was placed on the project.

At the same time, WPB partially relaxed restrictions on the Blackfeet, Montana, irrigation project to permit construction of a canal and headgate to replace the former canal system near Cut Bank, Montana, and rehabilitation of seven miles of canal. The project, which is part of the program of the U. S. Department of Interior, Bureau of Indian Affairs, was halted December 16, 1942.

● Chicago's Street Department finds a Thor pneumatic paving breaker a convenient tool for street construction work.

New Suction Dredge for Trinidad Built Near Equator

By Raymond P. Day

Eleven degrees off the equator, enterprising Britishers have recently finished building the first hydraulic suction dredge ever commissioned in the West Indies. When the dredge lowered its cutting head to bite the first chunks out of Laventille Swamp, which it is reclaiming for a seaplane base near Port of Spain, Trinidad, it filled a need which the British have felt sharply for some time.

The machine, powered by diesels purchased from the Standard Oil Company of Venezuela, was designed by S. R. H. Beard, resident engineer of the Deep Water Wharfage Scheme, along American lines. It is built almost identically with the "Missouri" and "Gallatin," which pumped Montana's Fort Peck hydraulic earthfill dam several years ago for the U. S. Army Engineers. The 110-foot hull, 34 feet wide and eight feet deep is made of greenheart; a hard, tenacious and heavy wood from British Guiana. Her main pump is driven directly from her diesel power.

The dredge was built by Captain O. H. Mendes under the supervision of Planning and Housing Commissioner Robert Grinnell.

Mass Concrete Placement in Home Stretch at Shasta Dam

Concrete in Block 58 in the right abutment of Shasta Dam is to roadway level, it was announced by the United States Bureau of Reclamation. A sidewalk and parapet walls remain to be added.

According to Construction Engineer Ralph Lowry the "topping-out" of Block 58 signalizes the entry into the home stretch of mass concrete placement. Mr. Lowry said that several blocks adjacent to No. 58 are expected to be poured to road level soon.

Nearly five and one-quarter million cubic yards of concrete have been placed in the structure, leaving about one million cubic yards to be added. As the majority of blocks in both abutment sections are nearing their ultimate height, the spillway section is to receive the bulk of the concrete remaining to be placed. On completion, Shasta Dam will contain 6,230,000 cubic yards of concrete, making it the second largest concrete dam ever built. Extending 602

PRODUCTION AND ADVANCES OF COAL STRIP MINING

Year	Total Production for Country	Strip Mining Production	Per Cent Stripped of Total Production	Per Cent Annual Increase of Total Production	Per Cent Annual Increase of Stripping Production
1938	348,544,764	30,406,855	8.7	--	--
1939	394,855,325	37,722,583	9.6	13	24
1940	460,771,500	43,167,336	9.4	17	14
1941	514,149,000	55,072,000	10.7	11	27
1942	580,000,000*	70,000,000*	12.1	12	27

*Estimated.

(Reprinted through the courtesy of Mining Congress Journal)

THE ENEMY CAN'T HEAR 'EM

His sensitive radio direction finders are constantly listening to detect and locate "signals" from powerful ignition systems. To foil him, we make every piece of equipment "silent" from a radio standpoint. It must pass a rigid test before it is ready to turn over for Army inspector's okay.

Special-purpose trucks involve special problems, sometimes seemingly remote from motor truck manufacturing. Ward LaFrance has the experience and know-how to meet such needs. It has been gained over a period of many years of building specially engineered fire apparatus and other special trucks of many different types.

In postwar replacement, fleet owners should give thought to the advantages of vehicles designed and built for the *exact* job they have to do. Operators of mines, quarries and large construction companies will be interested in the increasing use of special trucks to eliminate heavy capital investment in mechanical conveyor apparatus. Ward LaFrance engineers offer competent counsel to executives who are already looking forward to such postwar improvements.

WARD LaFRANCE TRUCK DIVISION

★ GREAT AMERICAN INDUSTRIES INC. ★

ELMIRA, NEW YORK

WARD LaFRANCE

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feet from the lowest point in the foundation to the crest, the dam is second in height to Boulder Dam, the world's highest.

For the past several weeks concrete placement operations have been concentrated largely in the spillway section where five of the rows of blocks have been brought to a height permitting installation of the lower tier of spillway outlets. These outlets are four steel-lined conduits each eight and one-half feet in diameter. Fourteen additional outlets of the same size will be installed at various levels as the spillway gap is filled. The outlets controlled by tube valves permit careful regulation of the reservoir level.

Two rows of blocks in the spillway section have been kept low and are used for river diversion. Concrete placement in the low rows will begin as soon as the valve installations in the diversion tunnel under the right abutment are complete.

Work on two of the 75,000-kilowatt generators in the Shasta Power Plant is rushing toward completion. The ultimate installation includes five mammoth generating sets.

The hydraulic turbine runner and the cover plate for one of the units have been assembled and the scroll case is nearly ready for testing. Generator assembly is expected to begin at an early date. The installation of the second unit is in progress also, with the expectation that the plant will be ready to put 150,000 kilowatts of power on the line in January 1944.

The construction of Shasta Dam is being expedited so that the structure may begin as early as possible to serve its designated functions of river regulation, improvement of navigation, flood control, supplying water for irrigation, salinity control, and furnishing power for war industries.

Alaskan Highway Will Be Widened

The Alcan Highway will be widened to 24 feet this summer through all of its 1,671-mile length, Brigadier General J. A. O'Connor, commander of the Northwest service command, has announced. The road is now said to be carrying almost 70,000 tons per month of cargo and can carry much more if necessary.

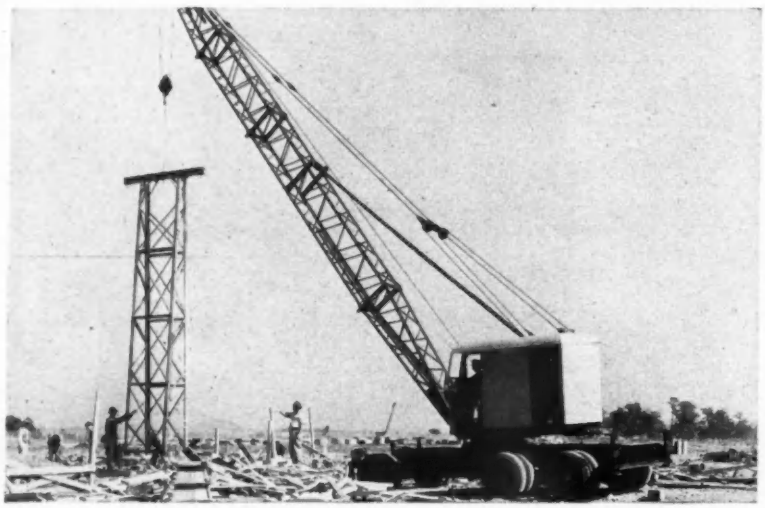
Demand for Equipment Far Outstrips the Supply

The necessity for putting into use all construction machinery now standing idle throughout the country was stressed by officials of the War Construction Board's construction machinery division. Lack of full utilization, according to reports from WPB regional offices, is seriously hampering the war effort. The demand for construction equipment both new and used far outstrips the supply, in spite of the fact that the industry is currently producing at the rate of approximately one billion dollars a year.

Building construction is declining, but the demand for almost every other kind of construction equipment is mounting. These uses have increased (by as much at 188 per cent in the case of track laying tractors, for example) due to the increased use of construction machinery in actual battle areas, the tempo of war work, and growing manpower shortages which place a heavy demand upon machinery.

Track laying tractors, cranes and shovels, graders, bituminous and concrete machinery, and jaw and roll crushers are used for clearing, grading and paving work at airports; for repair of bombed air fields, and cleaning away air-raid debris; for building military roads and bridges; and for loading and unloading the huge cargoes that must go with the fighting men. In addition to these and other military uses, construction equipment is needed for logging, mining, farming, petroleum production, and in the operation of numerous kinds of war plants.

The average nine months' backlog of unfilled orders for six critical types of new equipment emphasizes the urgency of full utilization of used equipment. Practically the entire output of new construction machinery goes to the



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PAUSE, Norseman, and look to the western horizon. For twenty centuries the Vikings roved beyond it. Today, hundreds of your brothers have escaped across this horizon, and will return with their allies to win back your Nazi-cursed soil.

You toil by day beneath the lash of your oppressors. But, by night, you strike back again and again—for your love of freedom is unconquerable.

As you do your part, so do we. The mine and quarry men of America are applying their effort and skill toward freedom for the world. The millions of tons of rock and coal and ore that they blast loose are the very genesis of war machines and munitions. To speed their work and safeguard their lives, the Ensign-Bickford Company is producing Safety Fuse, Primacord-Bickford Detonating Fuse, and other supplies essential to Victory—for *Victory Begins Underground!*

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E-P

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armed services, the construction machinery divisions points out, citing as an example the allocation in 1942 of 85 per cent of new track laying tractors directly to the military. Almost all new construction equipment not assigned to the armed forces is used to fulfill contracts for military services. New equipment is sent overseas in preference to used equipment in order to reduce maintenance and repair work to a minimum and provide uninterrupted service in situations where lives are at stake.

On the home front, used construction equipment must therefore do war work and the WPB is intensifying its drive to get all idle machinery into active service. The program was launched in the fall of 1942 with the issuance of an order (L-196) requiring the registration of all used construction machinery in WPB regional offices. A construction machinery specialist in each of these offices works with WPB officials in Washington to maintain a perpetual inventory of used equipment and its service status, and to supply needed equipment from the idle pool.

Approximately 350,000 items have been registered. Greater utilization of these machines must be obtained and redistribution of the more critical ones must be effected through rental or sale, the Division points out, before military and essential civilian requirements can be met.

Contractors in particular are being urged to release equipment they no longer need, now that building construction has declined. A well-functioning distribution of idle equipment will benefit all concerned, it is pointed out. The contractor who today is unwilling to sell or lease his ten idle tractors because a job may break next month, may find that he needs 20 tractors when he actually gets the job. Without a distribution program such as WPB is establishing, he will have half the equipment he needs; but with a pool of idle equipment (including his own) from which to draw, he may well be able to get the necessary 20 tractors and do the job on schedule, according to WPB officials.

Top Washington Officials Headline ARBA Program

Brigadier General Philip B. Fleming, administrator, Federal Works Agency, was scheduled as a principal speaker at the American Road Builders' Association annual meeting in Chicago, May 4-7. Public Roads Administrator Thomas H. MacDonald also was on the program which presented the highway industry and profession with an unparalleled opportunity to obtain the latest, most complete and accurate facts about the federal road program.

General Fleming's address covered not only highways but airport construction and other war work under his jurisdiction, which now has vital interest for road builders. Administrator MacDonald reviewed the current road program and plans for the immediate future. He also outlined and explained new policies and procedures of the Public Roads Administration.

The role of highways in the post-war program was defined by Frank W. Herring, assistant director, National Resources Planning Board. His discussion of comprehensive post-war studies recently completed by the board emphasized the necessity for a large highway program to insure prosperity after the war.

"Will the Navy Have Use for Contractors' Organizations and Equipment in 1944?" is the crucial question answered by Captain L. N. Moeller, director, Progress Control and Statistical Department, U. S. Navy Bureau of Yards and Docks. Captain Moeller gave ARBA delegates inside information on plans of the outfit whose shore construction program this year will exceed two and three-quarter billion dollars.

The U. S. Congress was well represented at the highway conclave. Leading the House delegation was Roads Committee Chairman J. W. Robinson of Utah. He presented his recommendations for post-war planning, urging that every state, county, city and regional area should have a planned program of highway construction ready for contract at the end of the war. Senator John L. McClellan of Arkansas stressed the importance of private enterprise in the

4 WAYS to get more service from WIRE ROPE

Yes, wire rope is tough. It can stand up to the most rigorous service—and ask for more.

But that's no reason to abuse it. With a little care, by applying a few simple rules, you can get a tremendous amount of extra service from your rope.

1 Break it in with light loads

For example, when breaking in a new rope, don't slam on full power and speed right off the bat. Begin with fairly light loads. Operate at moderate speed. Give the strands of the rope a chance to seat down snugly and uniformly upon the core, so that each strand is carrying its fair share of the load. This way, the rope will assume its proper "constructional stretch" without damage, and you'll be assured of better spooling and easier handling throughout the entire life of the rope.

2 Treat it with consideration

After the rope is broken in, you can safely use whatever speeds and loads it was designed for. But don't be unnecessarily rough, even then. A smooth, gradual application of power is just as efficient as slamming into the load with a jerk. The same is true of braking. It's the heavy jerks and surge loads that beat the guts out of a piece of rope. Nine times out of ten these can be avoided without losing time.

3 Know your rope

For example, if you're using a flexible 8-strand rope for high-speed work, don't overload it. This rope is built to withstand bending fatigue and fast operation—not for heavy hogging lifts. The opposite is true of heavy-duty 6-strand rope. Lift with it—but don't try to break speed records.

4 Right maintenance means plus service

Don't neglect the few simple maintenance precautions which require so little time yet return so much in extra service. Keep your rope properly lubricated. Don't operate it over sheaves that are abraded, damaged, or out of line. Fasten clips in the approved manner. Cut off a short length from the drum end of your rope from time to time so that "grief spots" are relocated over sheaves and drums.

Wire rope is now a war weapon. Its proper use is a service to your country and to yourself. If you want good, dependable rope, and friendly service, get in touch with the Bethlehem Wire Rope distributor in your territory. He's always ready and willing to serve you.

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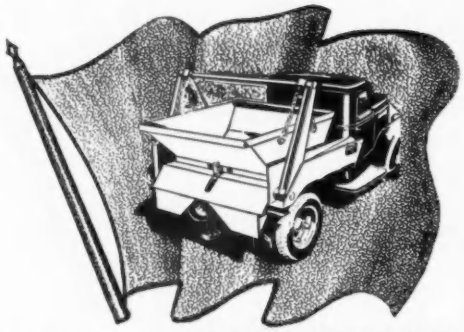

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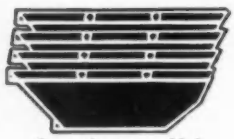

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will enable you to do just that! It's a short-cut method of moving hand-loaded materials. By utilizing several detachable buckets, hauled and dumped continuously, it eliminates idle truck time between load-ups and permits continuous operation. It utilizes your trucks to the utmost, insuring more payloads per day. Only 15 seconds are required for hoisting, dumping, spreading the material, or setting the bucket back on the ground. Write for catalog No. 44.

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Above picture shows a 6 cu. yd. Sauerman Scraper operating on a 450-ft. radius handling a 200,000-ton stockpile. Hourly capacity, either storing or reclaiming, is 200 tons.

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ON thousands of mining and construction projects, Sauerman Crescent scraper buckets have proved their ability to dig and convey large tonnages of gravel, clay, crushed stone, loose ore, etc., at costs of a few cents per ton handled.

The secret of this efficiency is in the streamline design of this unique bottomless bucket. A Crescent scraper penetrates hard materials with the ease of a plowshare, and both in digging and conveying it requires much less line-pull than any other scraper of equal rated capacity.

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post-war program, with particular attention to the benefits of a planned highway program in preventing unemployment and depression. "America at War" was the topic of West Virginia Congressman Jennings Randolph, main speaker at the President's Dinner, entertainment highlight of the meeting.

Two other House Roads Committee members, Congressman Jesse P. Wolcott of Michigan and James W. Mott of Oregon, participated in a panel on post-war planning. On this forum, authorities in their respective fields discussed the post-war problem from the viewpoint of state, county and city administration, equipment distributors and manufacturers and contractors.

Among other outstanding authorities invited to address the road builders' meet were Joseph E. Eastman, director, Office of Defense Transportation, and Robert Moses, commissioner, New York City Department of Parks.

Business meetings of all ARBA divisions were held during this conference and new officers were installed. Missouri Chief Engineer Carl W. Brown took office as association president and addressed delegates.

Start Quest for Minerals of War in Alaska

Following many of the trails blazed by the sourdoughs of '98, exploratory crews of the Bureau of Mines are braving Alaska's frigid weather and forbidding terrain in a quest for war minerals.

With a view to getting minerals for war and to foster a greater development of Alaska's ore reserves, the Bureau's crews are moving in by pack train, airplane, river boat, and dog team to little-known areas of the territory and are carrying on their work despite handicaps created by sub-zero weather, severe storms, and limited transportation facilities.

Much of the Bureau's search centers in the discarded material (tailings) left at placer operations and dredges by mining men of former days who sought only gold. Many of these tailings contain some valuable tin ore, and although the United States production of tin is very small, Alaska today leads the nation in its output.

The Bureau's exploration of the Lost River tin mine on the Seward Peninsula has indicated a substantial tonnage of low-grade tin ore. Tailings in the Manley Hot Springs area near the junction of the famed Yukon and Tanana Rivers are being sampled for tin ore by one group of engineers and geologists, while examinations have been made of tin placers in the Buck-Creek-Potato Mountain area, at Cape Mountain, near Tin City, and in the Lost River area, all on the Seward Peninsula, near the Arctic Circle.

Near Sleitmut, on the Koskokwim River, another Bureau of Mine's crew

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is sinking a shaft in search of more mercury ore. Here a considerable quantity of commercial-grade mercury ore has been found, and private interests, the Bureau has been advised, will begin development of the property in the near future. At Moose Creek, near Anchorage, several diamond drill holes have been driven to obtain an accurate picture of coal reserves in that region. On Prince of Wales Island in Southeastern Alaska, the Bureau is launching a new project for iron and copper ores.

Vitally needed tungsten is being sought near Hyder, also in Southeastern Alaska, and exploratory projects have been carried on at Yakobi Island for nickel and on the Kenai Peninsula for chromite.

The Bureau's exploratory work in the Territory already has resulted in the development of several ore beds, and reports of the mining engineers and metallurgists are transmitted regularly to various interested governmental agencies, including the War Production Board, the Defense Plant Corporation, the Board of Economic Warfare, the Reconstruction Finance Corporation, and the Army and Navy Munitions Board.

In its Alaska program, the Bureau of Mines works closely with the Geological Survey, also of the Department of the Interior, which launched its studies of the mineral resources of Alaska in 1895.

Select Albany, Oregon, as Site of Electro-development Laboratory

Albany, Oregon, has been selected as the site for the Northwest electro-development laboratory where Bureau of Mines metallurgists will study the recovery and processing of minerals from the Pacific Northwest as part of a program to utilize this region's vast resources in winning the war, it was announced by Secretary of the Interior Harold L. Ickes.

Negotiations have been completed for the purchase of the vacated buildings and grounds of the Lewis and Clark College, an institution that moved to Portland a few years ago, Secretary Ickes said, and the Bureau of Mines soon will begin converting the property into a laboratory.

Choice of the Oregon city was made by Secretary Ickes after a public hearing, at which congressmen, senators and other representatives from several Northwestern states assisted the Department in determining the most suitable site for the new laboratory. The prerequisites were a place close to the large mineral deposits of that section, ample electric power, convenient transportation, and an area where results of the research would be of maximum benefit.

"The Albany, Oregon, site meets the requirements for a laboratory to investigate improved methods of recovering magnesium and aluminum from the plentiful reserves of that area," the Secretary said, "together with research in the processing of nickel, tungsten, chromium, manganese, vanadium, and other strategic and critical minerals which are vital to the Nation's war economy."

Nearness to Oregon State College at Corvallis—only nine miles away—with that institution's engineering schools, libraries and laboratories, is another advantage of the Albany site, Secretary Ickes explained. Furthermore, the existing property of the Lewis and Clark College can be converted into an electro-development laboratory without the necessity of using critical materials for constructing buildings or installing pipelines, power wires or other facilities, he added.

The Bureau's past experiments in electro-metallurgical treatment of Western minerals have been conducted largely at Boulder City, Nevada, which is considerably removed from the mineral deposits of the Pacific Northwest.

Urge Adoption of Plan for Pooling Road Machinery

Pointing out that the failure to fully utilize existing equipment for civilian

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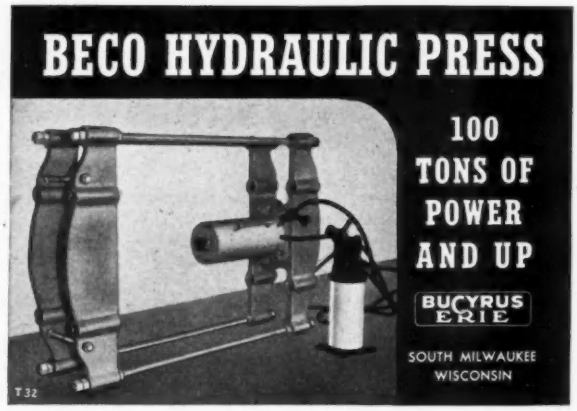

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American Tiger Brand is built tough, strong and long-lasting. No other wire rope will last longer under hard, continuous duty or is safer and easier to use. Its flexibility, its resistance to kinking and snarling, the fact that it is relaxed and inert make Tiger Brand Excellay Preformed always easy to handle. But to give *maximum* service and top efficiency it needs good care—and must have it today, when limited wire rope supplies have got to last longer.

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Every user of wire rope can get a lot of good ideas from this book. It's packed with easy-to-follow instructions, 48 pages of practical hints that will help avoid the common errors of handling and care which shorten rope life. Order as many copies as you need and get them into the hands of the right men.

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road-building will work hardships on all local governments undertaking road-building and maintenance work, the governmental division of the War Production Board urged the highway commissions which have not already done so to adopt the plan for pooling of road machinery and equipment initiated by the Division several weeks ago.

As the season for road construction and repairing is at hand, some commissioners are faced with the problem of obtaining necessary equipment. The problem is not the result of any lack of equipment for a survey of construction equipment owned by local governments shows there is enough such equipment within each state. The fault lies in inadequate use of the equipment, some of it being idle in one place when it is urgently needed elsewhere.

The pooling plan is designed to remedy this, making all equipment available to all local governments within each state.

The plan was initiated to reduce requirements for road-building machinery used on the home front because practically all new road-building machinery is being directly channelled to the military.

Though originating with the War Production Board, the plan is state operated with a state official as coordinator. Responsibility is completely in the hands of the state.

Twenty-one states, to date, have pooling plans in operation.

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Five —	2-cu. yd.	Type AU,	light-weight	Bucyrus-Erie buckets, weight	3,500 lbs.
One —	2¼-cu. yd.	Type AU,	light-weight	Bucyrus-Erie bucket, weight	4,000 lbs.
One —	2½-cu. yd.	Type AU,	light-weight	Bucyrus-Erie bucket, weight	4,250 lbs.
One —	4-cu. yd.	Type AU,	light-weight	Bucyrus-Erie bucket, weight	6,850 lbs.
One —	4-cu. yd.	Type Y,	heavy-duty	Bucyrus-Erie bucket, weight	11,500 lbs.
One —	7-cu. yd.	Type W,	medium-duty	Bucyrus-Monighan bucket, weight	13,700 lbs.

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IN MEMORIAM

JOHN BYRON GOLDSBOROUGH

John Byron Goldsborough, 79, prominent civil engineer widely recognized as an authority on the use of compressed air in construction work, died March 26 of injuries suffered in a fall at his home in Croton-on-Hudson, New York.

Chairman of the board of the unperpinning and Foundation Co., New York, Mr. Goldsborough had directed subway and other construction projects necessitating the use of compressed air, an engineering technique he was largely responsible for developing.

Mr. Goldsborough, a self-trained engineer, initiated the use of pneumatic devices in laying foundations for bridges on the Great Northern Railroad in 1892. Under his supervision the Great Northern road bed was extended to the Pacific Coast at Seattle, Washington.

His first big construction job was the building of the United States Hospital at Hot Springs, Arkansas. About 1900 he was called to New York to superintend the use of compressed air in the completion of the Harlem Ship Canal, upon which work had been delayed by a mud wave. He remained in New York as superintendent and chief engineer for the civil engineering firm of Coleman, Breuchaud & Coleman.

He was active in planning and constructing the water supply systems in New York and New England. After he founded the Underpinning and Foundation Company in 1909, Mr. Goldsborough built four sections of subway in New York City.

He was a life member of the American Society of Civil Engineers, and also belonged to the Engineers Club of New York City, the National Republican Club and the Sleepy Hollow Country Club at Scarborough, N. Y.

Surviving are his wife, Mrs. Ruth Canney Goldsborough; two sons, Frederick B. and John B. Goldsborough; a daughter, Mrs. Ann G. Egerter, and a brother, Earl M. Goldsborough.

Williams Named Kentucky's Highway Commissioner

Richard G. Williams was sworn into office April 1 as Kentucky's new commissioner of highways, succeeding J. Lyter Donaldson, who resigned to seek the Democratic nomination for governor. Williams, a resident of Somerset, was elevated from the post of rural

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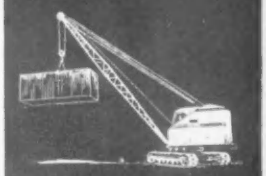

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IDAHO, BOISE: The Intermountain Equipment Co., Broadway at Myrtle St. Phone 171.

*ILLINOIS, CHICAGO: Bucyrus-Erie Company, 1312 Bankers Bldg., 105 W. Adams Street. Phone Franklin 5321.
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NOT in the *Contract*

The husband answering the phone said: "I don't know; call up the weather bureau," and hung up.

"What was that?" asked his wife.

"Some fellow asked if the coast was clear."

Nurse: "I think he's regaining consciousness. He just tried to blow the foam off his medicine."

Bride (viewing twin beds): "Ooohh!"

Husband: "What's the matter, dear?"

Bride: "I thought we were going to have a room to ourselves."

Voice on phone: "Are your father and mother at home?"

Little Johnny: "They was, but they isn't now."

Voice: "They was, but they isn't!—Where's your grammar!"

Johnny: "She's went out too."

Customer: "I'd like a dollar dinner, please."

Ritzy Waiter: "Yes, sir. On white or rye, sir?"

An old shovel runner was smoking in the waiting room of a railway station. A porter said to him: "Don't you see that notice on the wall, 'No Smoking Allowed'?"

"Yes, I do," said the shovel runner, "but how can I keep all your rules? There's another on the wall. 'Wear Janella Corsets.'"

"These rock formations," explained the guide, "were piled up here by the glaciers."

"But where are the glaciers?" asked a curious old lady.

"They've gone back, madam, to get more rocks," said the guide.

A bachelor is a man who never Mrs. Anything.

"This happens every time . . . can't you blow your nose more easy?"

Changes Hell

Three men, a lawyer, a doctor, and an engineer, appeared before St. Peter at the pearly gates.

The lawyer bewildered St. Peter with an eloquent address and before the venerable Saint could recover his composure he was handed a writ of mandamus and pushed aside and the lawyer strode through the open portals.

"I feel I know you Dr. Brown," St. Peter acknowledged the doctor's introduction, "many have said you sent them here before their time. Welcome to our city!"

The engineer, who had been standing in the background, now stepped forward.

"I am looking for a job," he said.

St. Peter wearily shook his head. "I am sorry," he replied, "we have no work here. If you want a job you can go to hell."

Hearing the familiar response made the engineer feel more at home. "Very well," he said, "I've had hell all my life so I guess I can stand it better than others."

"What are you? What do you do?" asked St. Peter. "I'm an engineer. I apply mathematical principles to the control of natural forces," the engineer replied.

This sounded meaningless to St. Peter and he lost his temper.

"Young man," he said, "you can go to hell with your mathematical principles and try your hand on some natural resources there."

"Always glad to tackle a tough job," said the engineer as he departed for the nether regions.

Strange reports soon reached St. Peter. Sounds of agony and suffering had been stilled in hell. New arrivals, after reviewing both places, selected the lower region. The Saint asked for a report on hell.

"That engineer," reported the messenger, "has transformed the place. You would not know it. He has harnessed the fiery furnaces for light and power. He has cooled the entire place with artificial refrigeration.

"The brimstone lakes have been drained and the air filled with cool perfumed breezes. He has built bridges across the bottomless abyss and has bored tunnels through obsidian cliffs. There are paved streets, gardens, playgrounds, lakes, rivers and beautiful waterfalls.

"That engineer has gone through hell and made it a realm of happiness, peace and industry."

A vicar was asked by one of his least respectable parishioners to say prayers on Sunday for Anna Bell. The clergyman did so.

A few days later he asked the parishioner if he desired the prayers for Anna Bell to be repeated.

"No thank 'ee kindly, sir, she won last Monday at 7 to 1."

Shots from the Firing Line

(*Continued from page 250*)

highway commissioner. Both Williams and Donaldson were lauded by Governor Keen Johnson as the change was made.

In praising the administration of Donaldson since his appointment in January, 1940, Governor Johnson said that it was a source of bitter disappointment that the program agreed upon early in 1940 has been partly frustrated.

Governor Johnson's reference was to a 1940 policy committing the State Department of Highways to completion of trunk highways as its primary objective. This policy was founded on the belief that added gasoline tax revenue from a network of high-type trunk highways would finance a supplementary program for improvement of feeder roads. War conditions, however, forced this program into the background. As in other states, Kentucky's current activities are confined principally to vital maintenance, completing old contracts, and building access roads in military areas.

Trinidad Contractors Win Army-Navy "E" Award

By Raymond P. Day

In as colorful a ceremony of this colonial possession has ever seen, Rear Admiral Jesse B. Oldendorf, U. S. N., Commandant of the Trinidad Naval Operating Base, presented to James Stewart Company Associates of New York the Army-Navy "E" Pennant—emblem of recognition by the American fighting forces for exceptional performance on the construction front. Held in March and broadcast by short wave to the United States, the ceremony was unusual in that it was the first occasion of its kind ever held in a British Colony.

As if to emphasize the solidarity between English speaking nations, the official-guest platform was crowded with British and American notables, all from the places of high human achievement. Admiral Oldendorf was accompanied by Andrew Fischer, operating manager of James Stewart Company, who received the flag from the admiral; Major General Henry C. Pratt, Trinidad com-

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To keep them digging for the duration—(an especially long life of usefullness)—Owen Bucket repair parts are stocked at convenient points throughout the continent.

Distributors will be found ready and able to render prompt, efficient service.

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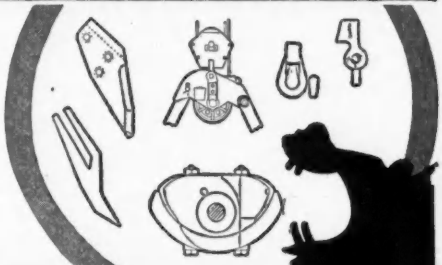

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WILLIAMS Buckets

BUILT TO LAST AND MOVE DIRT FAST

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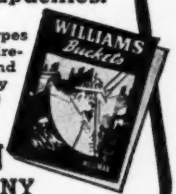
eliminates cumbersome dead weight and insures a stronger bucket that will wear longer with less breakage and less cost for maintenance.

This welded design which has made Williams Buckets so universally used in steel mill service is now featured in all Williams Clamshell and Dragline Buckets, 3/8 to 16½ yd. capacities.

Send for free bulletin covering types of buckets for your particular requirements. It shows details of design and many exclusive features that clearly prove why YOUR NEXT BUCKET SHOULD BE A WILLIAMS.



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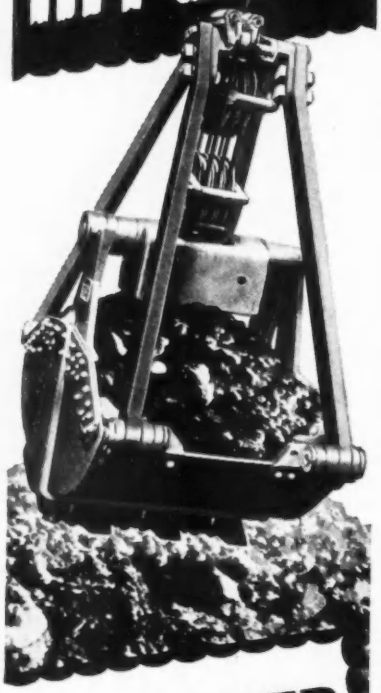

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Engineered all the way through to do the job. Backed by fifty years of specialized manufacturing skill and experience. The pay-off bucket for better, more efficient 1943 work.

Haiss Hi-Power has the brute strength for heavy digging, and the power in its bite to yank loose an embedded boulder. Weight and closing power combine to dig deep and tear out a heaping bowlful at every grab. Alloy steel parts for abrasion resistance, long bearings for longer wear.

★ *Bucket agencies throughout the country. Write, wire for prices, delivery and catalogs.*

GEORGE HAISS MANUFACTURING CO., INC.

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mander of the U. S. Army; His Excellency the Governor Sir Bede Clifford; Honorable John F. Nicoll, acting Colonial Secretary; and Colonel Philip F. Kromer, Jr., U. S. Army District Engineer.

In the audience were American construction stiffs in hard hats and greasy regalia, hundreds of natives who look like Alabama negroes but speak His Majesty's brand of English, bulldozer operators, shovel and crane runners, electricians, and here and there a sprinkling of Chinese - Indian office workers. Such was the assemblange which received the award.

Mr. Fischer pointed out that the company policy of utilizing local native workmen had justified itself. The time spent in developing these workmen into laborers and mechanics has resulted in an ever increasing rate of production. Credit for this keen insight into an international problem of human relations was given by both Fischer and Admiral Oldendorf to John Sweeney, Trinidad operating manager for the contractors, who was ill in the United States at the time of the ceremony.

The Trinidad Operating Base is one of several bases leased to the United States in 1941 by Great Britain. Speed has always been a keynote of construction. Three months before the agreement for lease of sites was signed in London, U. S. technicians had arrived and were making surveys and plans. Only four days after its signature the United States flag was unfurled over a token Marine camp and four months later, on August 1, 1941, the commissioning ceremony of the naval operating and naval air station was held.

Construction details are, of course, secret. It is enough to say the scene is foreign but the work is typically American, being duplicated in the United States every day. But here, where supply lines run through the U-boat gauntlet and every piece of lumber is precious, the construction of the U. S. base assumes added significance in the world picture.

Minnesota Highway Construction

A bridge over the Mississippi river in Minneapolis, two railway underpasses, and construction of access roads between Robbinsdale and New Brighton, Minnesota, at total cost of $1,100,000 is being considered by the Minnesota State Highway department.

Clay Heads Georgia Highway Department

Ryburn G. Clay, an executive agent of the Georgia State Highway Department, was appointed permanent director of that agency April 12 by Governor Ellis Arnall. At the same time the governor announced appointment of a new State Highway Commission, headed by James L. Gillis, who was a member of the highway board under former Governor E. D. Rivers.

Due to wartime shortages in materials, labor and funds, the new Georgia road department setup will be charged with spending only about $2,550,000 this year, compared to $12,295,000 appropriated for the former commission, which Arnall abolished. The current year's activities will be restricted principally to maintenance.

Other members of the new commission, besides Gillis, include Steve C. Tate, Sims Garrett, L. Roy Robinson, J. J. Milam, Hugh Burgess, Penn Selman, Frank A. Dennis, Lonnie A. Pope, Knox Gholston, Wick Knox and Morris Tift.

Withdraw Authorization On Highway Construction

To conserve manpower, materials and machinery, the War Production Board withdrew a blanket authorization which had permitted road departments to begin highway construction jobs provided no critical materials which had been acquired after May 6, 1942 were used.

This authorization, which in effect gave road departments the right to build any roads where no priority assistance was required was revoked so that equipment and materials tied up on some of these jobs might be diverted to the construction of important military and access highways.

Simultaneously, the War Production Board delegated to regional directors the authority to permit the start of highway construction jobs costing less than $100,000 where Federal funds are not required and where no priority assistance is needed. Regional directors of WPB will exercise this authority after consultation with district engineers of the Public Roads Administration of the Federal Works Agency.

Since highway construction jobs costing more than $100,000 must come to the War Production Board for approval by the Facility Review Committee, these applications will be processed in Washington by the Governmental Division of WPB. Similarly, roads requiring Federal funds must come to Washington for certification of their essentiality, so these applications also will be processed in Washington.

Plan New Levees Construction

Plans for the construction of new levees and raising of old ones along the Sacramento and Feather rivers and their tributaries, and along the Sutter and Yolo by-passes, and also the clearing of overflow channels and protection of river banks is being planned by the U. S. Engineers office at Sacramento, California.

Underground Telephone Cable

Plans for the construction of 110 miles of underground telephone cable from Stroud to Holdenville, Oklahoma, at an approximate cost of $2,523,000 are being made by the Southwestern Bell Telephone Company of Oklahoma City, Oklahoma.

GIVE 'EM THE ONCE OVER EVERY DAY

● Built to haul heavy excavation in off-the-highway service, Rear-Dump and Bottom-Dump EUCLIDS are moving countless tons of earth, ore and rock on jobs that are vitally important to our war program. Like other material moving equipment, new EUCLIDS are obtainable only for high priority jobs so units now in service must be kept rolling.

Because it may be difficult to obtain replacement parts promptly, regular servicing and inspection is more important than ever if capacity production of your equipment is to be maintained. This daily check list may help to reduce idle equipment time:

1. Check crank case oil, radiator fluid, tire pressures, air reservoir and battery.
2. Service air cleaner and oil filler breather.
3. Check oil filter cartridge, and replace if dirty.
4. Tighten all bolts, nuts and connections.
5. Lubricate according to Euclid instruction manual.

This is only a partial list of the points that should be checked and serviced regularly — refer to your Euclid Instruction Manual for detailed instructions or write our Service Department if you have a special problem.

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CLEVELAND, OHIO

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SELF-POWERED HAULING EQUIPMENT
For EARTH.. ROCK.. COAL.. ORE

CRAWLER WAGONS • ROTARY SCRAPERS • TAMPING ROLLERS

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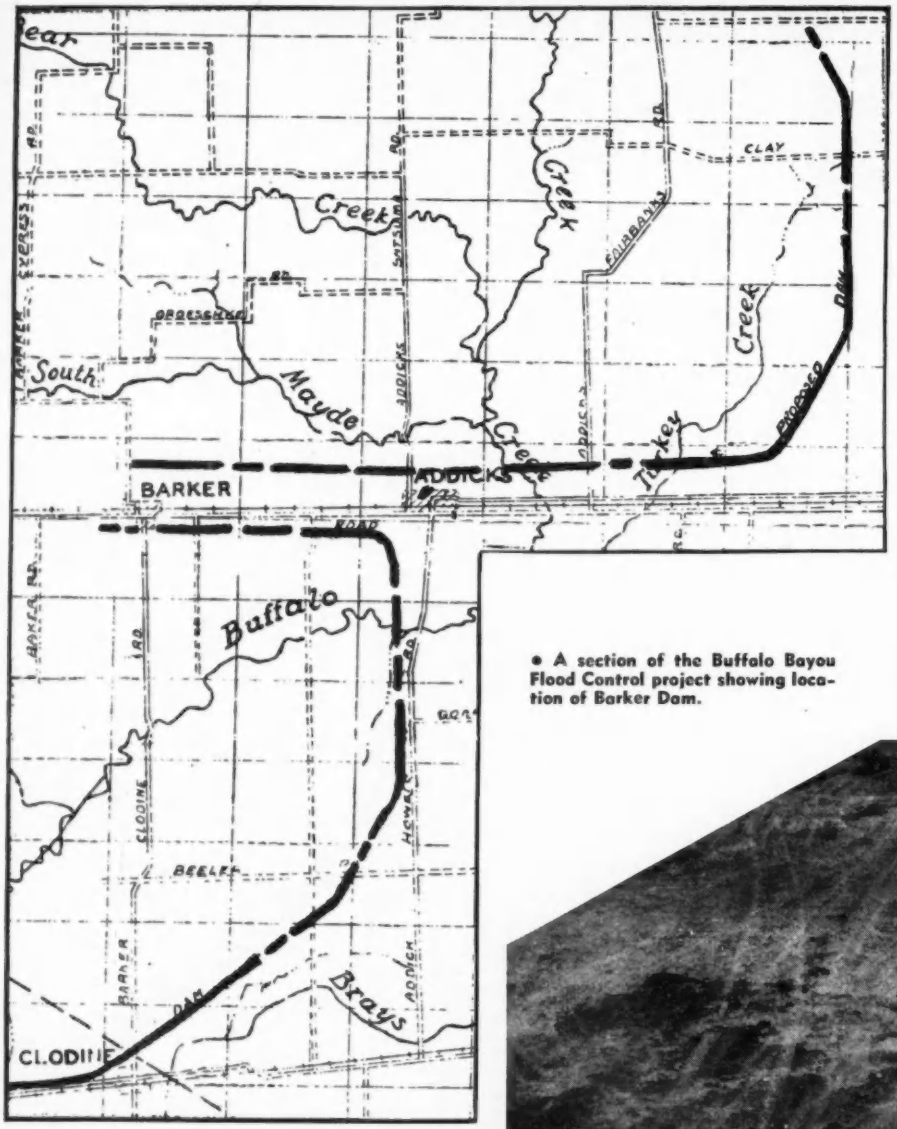
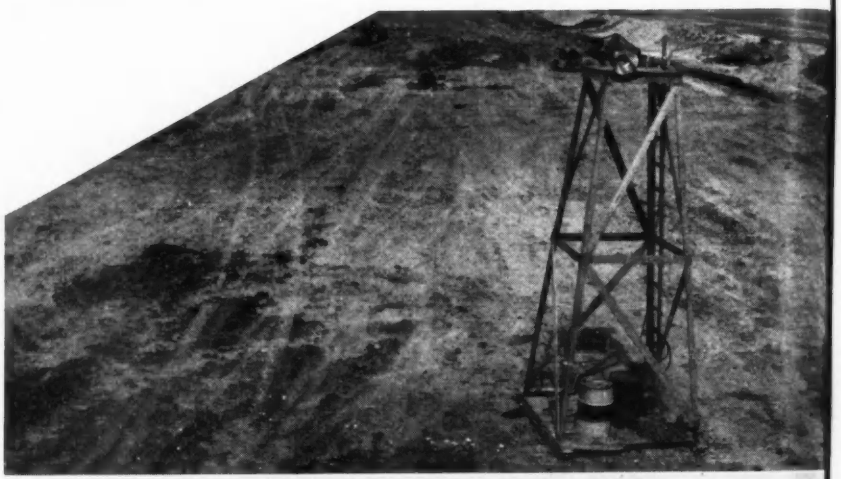


• A section of the Buffalo Bayou Flood Control project showing location of Barker Dam.

density than its natural state. The drainage ditches required 307,000 cubic yards of excavation. Reinforcing steel of standard type was used to the extent of 304,000 pounds and 1,356 feet of 36-inch, 60-inch and 96-inch corrugated metal pipe with a bituminous coating was used under roadways to connect the borrows and ditches. Other dirt-moving figures include 882,000 cubic yards of channel excavation on the rectification channel and 145,000 cubic yards of top soiling, of which 30,000 cubic yards have been placed.

Although this dam is but the beginning of the proposed program, it is a start in the matter of flood control for Harris County and is the introduction to a dirt handling operation that will be one of the major jobs of its type in the nation.



Barker Dam

(*Continued from page 227*)

foot bottom width and three to one side slopes at a .065 grade, and the last half a 40 foot bottom width with three to one side slopes on a .000 grade.

By way of summary, the Barker Dam job carried the proposal for 3,409,000 cubic yards of dirt for the fill, but the finished job for the present represents 1,132,000 yards. The borrow exceeded the fill slightly with 1,168,000 cubic yards of dirt excavated, due to the material compacting to a greater

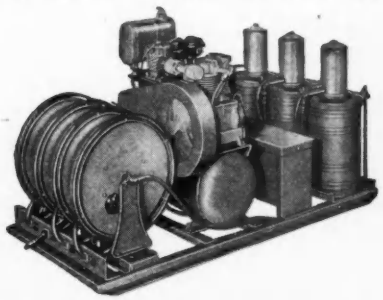
• Tractors and scrapers hauling from borrow area to embankment.
• Bucyrus-Monighan casting dirt to the slopes of the embankment fill.

Equipment you ought to KNOW ABOUT

Field lubrication unit

Manufacturer: The Gray Company, Incorporated, Minneapolis, Minnesota.

Claims: A new model, the LU-150 Braco Convoy Luber, was designed primarily for the smaller contractor who doesn't need a large portable field lubrication unit, but who still feels the need of some sort of power lubrication of his construction equipment. The unit dispenses lubricant directly from original 100-lb. drums. It is powered with a 4½



h.p. air-cooled gas engine, running a 12 cu. ft. air compressor, with a working pressure of 175-lbs. air pressure, supplying a 35-gallon storage tank. Three lubricant pumps dispense gear lube, track or hypoid lube and chassis lube. Four large hose reels with locking brakes provide three 30-ft. high pressure lubricant hoses which make the largest of equipment accessible to the Convoy Luber. A 50-ft. air line on the fourth reel quickly services large pneumatic tires of all kinds.

Welding electrode

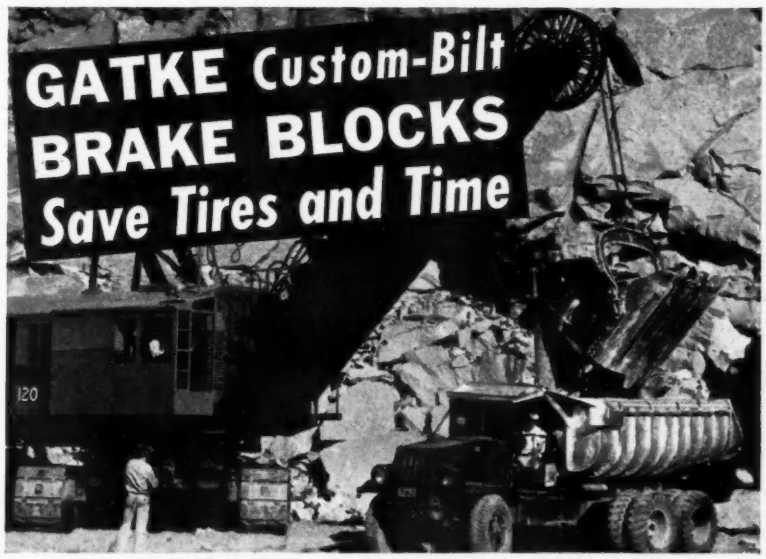
Manufacturer: R. G. LeTourneau, Inc., Peoria, Illinois.

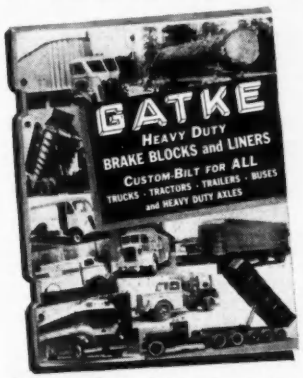
Claims: Especially developed for use in building up track-rollers, rails and other similar parts of machines subjected to a combination of impacts and heavy bearing wear, this electrode is called Tournaweld RW. It is characterized by rapid burn-off, smooth operation and uniform deposit of highly alloyed, tough, hard surfacing metal which is sufficiently soft in the as-deposited condition to be ground according to the best practice employed in rebuilding track-rollers.

New spatterproof lamp for welders

Manufacturer: Radiant Lamp Corporation, 260 Sherman Avenue, Newark, New Jersey.

Claims: A new spatterproof lamp for welding known as the Radiant Spatterproof Lamp. It is made of a special glass that resists penetration of hot metal particles, and it is built to withstand severe handling. By reducing lamp replacements, the new units not only save money but increase the worker's production. The lamps have a T10 bulb with medium screw base.





Ask your Gatke Jobber for a Gatke Brake Survey or write us.

"To *haul more, faster, with less*" you need the *extra* advantages of GATKE *CUSTOM-BILT* Brake Blocks and Liners—

The smooth, non-grabbing action that *avoids* rubber-grinding skids and needless strain on equipment.

The *tremendous resistance to heat and hard service* gives dependable holding power under all service conditions.

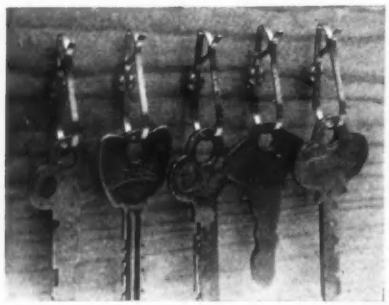
The *long wear life* which keeps equipment working without tie-ups for brake adjustments.

For details ask your GATKE Jobber or write.

GATKE BRAKE BLOCKS are CUSTOM-BILT for all makes and models of trucks, trailers, buses and other heavy duty equipment.

GATKE CORPORATION
HEAVY DUTY BRAKE BLOCK DIVISION
232 N. La Salle St. Chicago, Ill.

Field NOTES



• You can save the time frequently used in searching for lost keys if you use this simple idea.

Prevents Loss of Keys

For convenience, or as a precaution, single keys are often kept in one place or at one spot about the job. In most instances they are placed on small nails or on the usual hooks where they may be readily knocked off. On spots around tool sheds and houses of a portable nature they are all too often lost.

Procure a number of common spring safety cup hooks as shown in the picture. Small screws are easily turned into almost any kind of wood with the safety hook alone as a handle. The keys are easily taken out and put back into place. Keys attached to these cup hooks may be shaken or the hook may be inverted, without the key coming loose.

This method of hanging keys is very handy for the job office, portable tool sheds, tool trucks and other places where single keys are necessarily kept together, but taken out for use only one at a time.—*Frank W. Bentley, Jr.*

Belts vs. Chains

Once in a while we hear impossible claims concerning various belts which are doubtless based on enthusiasm rather than on facts. How often have we heard the statement, "my belt pulls like a chain?"

There is no belt in the world that pulls like a chain and there never will be. The only way in which a belt can be made to pull like a chain is to put teeth into it, but as soon as teeth are put into a belt it is no longer a belt. It then becomes a "tooth drive." This applies to all belts regardless of material—leather, rubber, cotton, balata and even steel.

All belts slip, or creep, regardless of material. Chains neither slip nor creep. Creep in a belt is unavoidable because all belts are elastic. Creep in an elastic property and can be computed in advance with positive precision. Creep and slip in a chain drive are both impossible. — *W. F. Schaphorst, M.E.*

Old Dredger

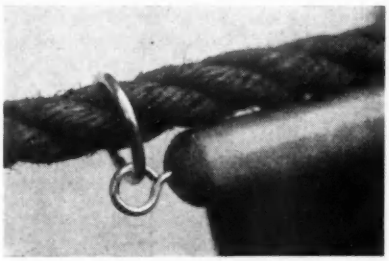
"Paul's Deep-Draining Machine can be worked with three or more horses, and, by a single operation, cut a drain from three to four feet in depth at the rate of 300 feet per hour, leaving a level bottom for the tiles to rest upon."

The above paragraph was taken from an advertising claim printed in a London, England, publication in 1849, in connection with the picture of "Paul's Deep-Draining Machine," reproduced on this page.

"It is also calculated for raising sub-soil to the surface for the purpose of claying lands, and when the clay is in a plastic state, will raise from four to five hundred weight per minute.

"It may be used to greatest advantage when the surface of the soil may have become so hard, either from frost or dry weather, as to render it impractical to accomplish the cutting of drains by manual labor," the claim continues.

"The utility of this implement, when it is required to cut drains on clover lands in course for wheat crops, and from which the first crop has been taken, is clearly seen; as the clay, from being immediately spread upon the surface, becomes thoroughly pulverized, and comes into immediate operation for the succeeding crop."

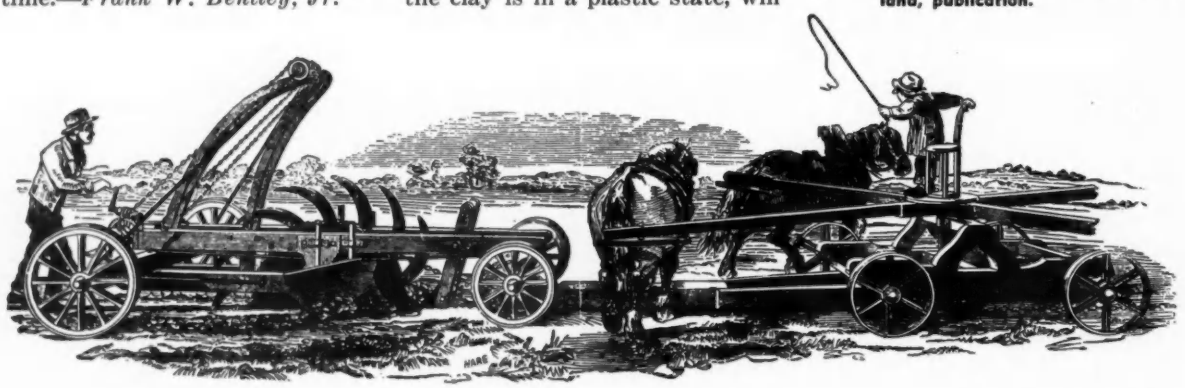


• This simple idea will save a lot of time fastening warning flags into place.

Warning Flag Fastener

The common red warning flag, usually tacked to a small round stick or pole, is at times conveniently hung to ropes or bars, and tied to place with anything that can be found on the spur of the moment. A small screw-eye can be put in each end of the staff and a loose leaf ring used to securely fasten the flag into place. When not in use, the rings can be kept conveniently together in one of the eyes.

• Proof of the great improvement in dredging equipment is indicated in this picture of an 1849 model dredger printed in a London, England, publication.



Notes from the manufacturers

Bucyrus-Erie Company, South Milwaukee, Wisconsin, has announced the appointment of N. R. Knox, formerly vice-president, to the presidency of the firm. He succeeds W. W. Coleman who held the position for 32 years. Mr. Coleman will continue with the company as chairman of the board of directors. G. A. Morison, who had been vice-president, was made vice-chairman of the board and W. L. Litle, works manager of the firm's Erie, Pennsylvania, plant was named vice-president. W. M. Bager, formerly a vice-president, was named technical director. N. A. McGrath remains as secretary and J. G. Miller as treasurer. Mr. Knox rose to his present position from the Bucyrus-Erie foundry cleaning room where he started work after his graduation from Harvard in 1920. In 1929 he was made assistant to the vice-president, and in 1933 was made vice-president.

Athey Truss Wheel Company, Chicago, Illinois, announces that Ben F. Lease, formerly manager of service and research, has been made domestic sales manager.

Chain Belt Company, Milwaukee, Wisconsin, has announced the appointment of William W. Klemme as district manager of industrial sales in Dallas, Texas. Mr. Klemme, previously district manager at Buffalo, New York, has been connected with the company since 1935.

General Electric Company, Schenectady, New York, has announced that in order to aid industry with electronic application problems, the company has appointed 18 industrial electronic specialists in G-E offices throughout the country.

Hercules Powder Company, Wilmington, Delaware, announces that the board of directors of the company has elected Edward B. Morrow as a vice-president, and named Francis J. Kennerley to succeed Mr. Morrow as treasurer.

S K F Industries, Incorporated, Philadelphia, Pennsylvania, has announced three executive promotions following a recent meeting of the board of directors. Thomas W. Dinlocker was elected vice-president and treasurer, Richard H. DeMott, vice-president in charge of sales, and C. P. Collins, secretary. William L. Batt, vice-chairman of the War Production Board, retains the presidency.

Taylor-Wharton Iron and Steel Company, High Bridge, New Jersey, has announced the award of the company's 50-year medal to L. N. Aller, secretary-treasurer. This award brought to 15 the number of men now living who have been employed by the company for 50 years or more.

H. K. Porter Company, Pittsburgh, Pennsylvania, manufacturer of industrial locomotives and process equipment, announce the opening of a district office for eastern Pennsylvania, western New Jersey, Maryland, and Delaware. Roy B. Rose, an executive of the company, has been named manager.

Harnischfeger Corporation, Milwaukee, Wisconsin, has announced that Frederick Salditt, vice-president in charge of sales, was elected a member of the board of directors to fill the vacancy of the late Joseph H. Harnischfeger.

Independent Pneumatic Tool Company, Chicago, Illinois, has announced that N. C. Hurley, Jr., was elected executive vice-president of the company. Mr. Hurley has been associated with the company for 11 years, serving the past four years as vice-president and director. John A. McGuire was elected secretary, and E. R. Wyler was named vice-president with headquarters in New York City.

WANTED: More Wire Rope

FOR ESSENTIAL WAR WORK

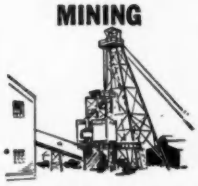
EVERY WIRE ROPE USER CAN HELP

OIL INDUSTRY

CONSTRUCTION

LOGGING

MINING



MANUFACTURING

WAR MACHINES

SHIP BUILDING

SHIPPING

Your wire rope is *production* equipment—a moving part subject to the same factors of wear and tear as that of any other operating machinery.

The selection of the correct grade, size and type of wire rope . . . proper installation and equipment . . . consistent maintenance procedures—all will contribute to longer life thereby releasing more wire rope for the immediate Victory Cause . . . a patriotic and profitable measure every wire rope user can employ.

May we send you a copy of "Practical Information on the Use and Care of Wire Rope?"—no obligation.

The day after day performance record of "HERCULES" (Red-Strand) Wire Rope is demonstrating that it has what it takes to meet 1943 conditions. In "HERCULES" there is a "right" rope for every heavy duty purpose, as it is furnished in both Round Strand and Flattened Strand constructions—all of which are available in either the Standard or Preformed type.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

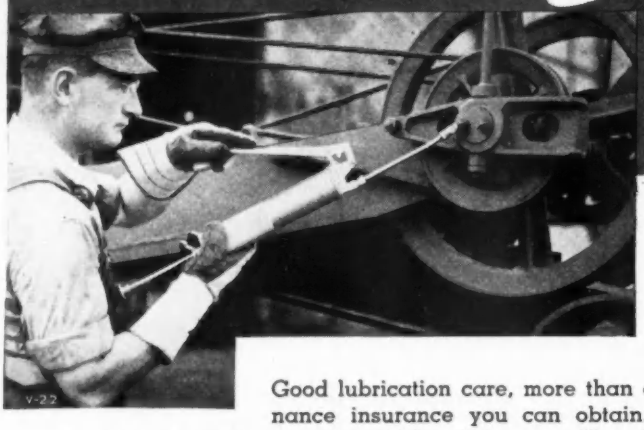
WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street

SAN FRANCISCO • • 520 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

WATCH Your Lubrication!



Your present excavating equipment will probably have to last for the duration. Under pressure for more and more output in its vital service on the production front, it is operating at top capacity, — very likely three shifts per day.

Good lubrication care, more than anything else, is the most effective maintenance insurance you can obtain. Proper lubrication will extend the life of your excavator, it will avoid breakdowns, will reduce cost of operation and increase output by reducing delays.

To keep your equipment in fighting condition, do these things:

Lubricate each part regularly and thoroughly as prescribed by your manufacturer's operating instructions.

Use the **right amount** of lubricant. Too much can sometimes be harmful.

Use the **right lubricant** as specified for each fitting and part. A good lubricant when applied in the wrong place may be more harmful than none at all.

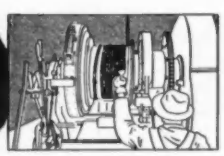
Use only **good quality** lubricants. "Cheap" oils and greases are dangerous to the machine.

KEEP LUBRICANTS CLEAN

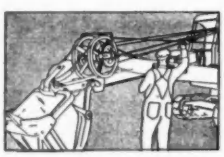
BUCYRUS ERIE

A good operator takes pride in his machine. He keeps it clean and trim and properly lubricated always. It pays off in smooth, continuous performance, maximum production, and long operating life.

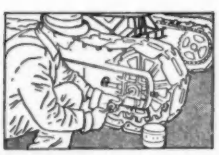
HERE ARE A FEW SPECIAL POINTS TO WATCH



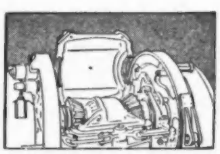
1. Ropes and drums should be lubricated regularly. Apply a thin layer often to avoid splatter in operation



2. Be sure to lubricate the suspension ropes. They are likely to rust their strength away if you don't.



3. Lubricate cats even if machine is not propelled much, as normal digging reactions cause some wear



4. Keep the proper amount as well as the correct grade of oil in your gear enclosures at all times.

Bucyrus-Erie employees have accepted the award of the Army-Navy "E" as a challenge to keep production rising. * *

Bucyrus-Erie

SOUTH MILWAUKEE • WISCONSIN • U. S. A.

New trade literature

Title: "Conservation of Construction Equipment and Facilities"

Subject: Of convenient pocket size this book is designed for use by key men directly responsible for maintenance and operation of equipment and critical materials. The opening chapter of the book is entitled Plant Layout and presents suggestions for laying out a construction project so as to conserve manpower and economize in the use of critical materials. Construction Equipment is the title of the second section which presents basic principles governing use, care and repair of equipment. Final chapter of the book is devoted to salvage and reclamation which the manual points out should be a continuous activity.

Where to Get: Construction Foundation, Munsey Building, Washington, D. C. Price 50c per copy, $5.00 per dozen.

Title: "Buckeye Spreader"

Subject: An interesting 8-page two-color booklet replete with illustrations of spreading machinery on various jobs. Specifications are also given.

Where to Get: Buckeye Traction Ditcher Company, Findlay, Ohio. Free upon request.

POSITIONS WANTED

Address all box numbers c/o EXCAVATING ENGINEER South Milwaukee, Wis.

Dragline-Shovel Operator

Experienced operator on small machines gas and diesel from ⅜ to 2¼ yards capacity wants steady work. Can handle draglines and shovels. Has worked on Koehring, P&H, Lima, Bucyrus-Erie and Unit machines. 14 years experience. Age 34. Married; one child. Selective Service Classification 3-A. Good health. Can make ordinary repairs. Willing to go anywhere in U. S. A. for right job. References. Box 9207

Shop Foreman and Service Engineer

Has handled service, repairs and operations on excavating equipment. Also qualifies as operator. Age 38; married; two children. Located Ohio. Will go anywhere in U. S. for steady employment. Box 9208

Shovel-Crane Operator

Want job as shovel or crane operator. Have had 20 years experience on electric, gas and diesel machines. Box 9209

SALESMAN WANTED

Man now calling on tractor owners and dealers, road contractors, municipalities, county and state highway depts. to add side line of essential tractor repair part. Splendid field for immediate profitable volume. Give full details of lines sold and territory covered. ALLIED STEEL PRODUCTS, Inc., N.B.C. Building, Cleveland, Ohio.

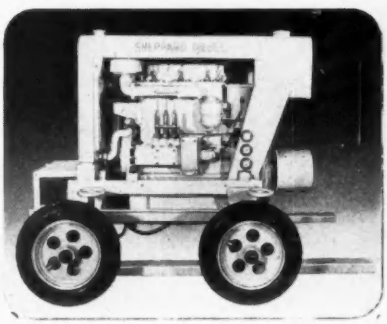
MASTER MECHANIC

Wanted position as master mechanic of all heavy equipment. Steam Gasoline Diesel or Electric. Shovels, cranes, draglines, and tractors. 30 years experience in construction work of all kinds. Can handle men. 2 years in South America. Now located Wisconsin. Box 9205

SHEPPARD

"Packaged Power"

PACKS A PROFIT!



Power cost savings mean more *profits* for you! In present and post-war operation . . . look to Sheppard for "Packaged Power" for low operating and maintenance cost. Portability of this compact Sheppard unit means economical auxiliary power wherever it is needed.

The trailer mounted Sheppard Model 6—25 H.P. continuous duty Diesel is of rugged construction . . . built for long, tough usage. This engine is complete with radiator cooling, battery starting and power take-off pulley. The cost of operating this complete, compact Diesel power unit is only ½ the cost of operating with other types of power. Diesel engineering eliminates many moving parts and an electrical ignition system . . . both prime sources of trouble.

Sheppard All-American Diesels . . . for driving construction, mining and refining machinery and equipment . . . for generating electricity . . . provide power where it's needed at savings that build profits! Write today for specifications and data on Sheppard "Packaged Power."

R. H. SHEPPARD CO.
HANOVER, PA.

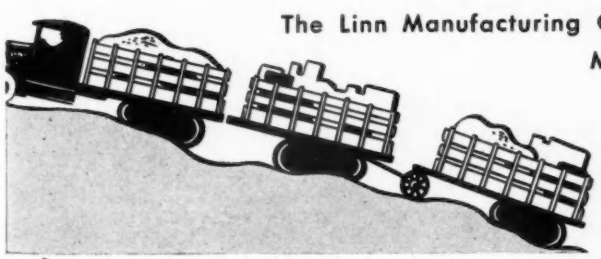
"Packaged Power"
Sheppard
ALL AMERICAN
Diesels

LINN

CONTOUR-FOLLOWING TRACTION

HAFTRAK and Traktrailer transportation are moving **heavy war loads** throughout the world today. Since 1916 LINN has pioneered Haftrack. The more it carries, the more it can pull.

The Linn Manufacturing Corporation
Morris, N. Y.



TO ADVERTISE: All advertising in this section is payable in advance. Rate: 60c per line, or $7.20 per inch of 12 lines. Minimum charge $2.40. No discounts; no commissions. If no change in copy is desired, three continuous insertions are offered for the price of two. Read these instructions carefully. Each line contains 41 characters (34 characters if all capital letters are used). Count spaces and punctuation as one character each. Allow 10 characters for box number, if blind advertisement is desired. Count your own copy to save delay. Be sure to enclose the correct amount of money with your order. Closing date—15th of preceding month. Example: January issue closes December 15th.

FOR SALE

TO INQUIRE: Be sure to address your inquiry to the advertiser by using the correct box number. Mail your letter in care of Excavating Engineer, South Milwaukee, Wisconsin. Write each advertiser a separate letter. Do not write us for name and address of advertiser. This information will not be given out. We have no information about the equipment advertised other than that shown in the advertisements themselves.

FOR SALE

1¼ YD. KOEHRING gas shovel, clamshell and dragline. 55' boom. Clamshell bucket. Now located Indianapolis. Available for immediate delivery. Box 2961

TYPE B Erie Steam Shovel, ⅞ yd. dipper, crawler mounting, 40' clamshell boom and clamshell bucket, in good operating condition. Box 2955

2-W Walking Dragline, good condition, middle west location, reasonable price. Box 2958

QUARRY SHOVELS

TWO 4-YARD full revolving electric quarry shovels. Now operating. Can be inspected. Available prompty. Midwest. Box 2965

CRANE BOOM

100-foot boom (4 25-ft. sections) for Model 700 P&H. Good as new—bargain $900.00. Inquire Kuesel Coal Co., City Hall Square, Milwaukee, Wis. Phone MArquette 1500.

NEW ENGINE FOR SALE

1—Hercules Second Altitude Gas Engine—Model "WCX-3"—6 cylinders—4¼" bore x 4½" stroke—75 H.P. @ 1575 R.P.M. idling speed.

Further information will be gladly furnished upon request.

Write — Telephone — Wire

Parts Department

Bucyrus-Erie Company
South Milwaukee, Wisconsin

40 ton Vulcan saddle tank locomotive
5 ton Plymouth gas locomotive; 36" gauge
40 ton Brownhoist locomotive crane
20 ton Browning locomotive crane
3—5 yd. Koehring Dumptors
MACKINTOSH ENGINEERING CO.
2907 Library Ave. Cleveland, Ohio

37-B SHOVEL EQUIPMENT

Shovel front end equipment for Bucyrus-Erie 37-B consisting of 21'6" boom, 15' handle and 1½ yard inserted tooth cast front dipper. All in good shape. Located Texas. Box 2966

2 5-yd. Clamshell Buckets suitable for ore handling. Located East Chicago, Indiana. Box 2956

FOR SALE

COMPLETE 1½ cu. yd. shovel front end for Bucyrus-Erie 37-B, up to Serial No. 15000, including boom, handle, dipper, and crowd machinery. Located Chicago. Available immediately. Box 2944

For Type GA-2 Bucyrus-Erie Shovel

1—24 ft. Boom and Crowd Engine
1—18 ft. Dipper Handle
1—1¼ cu. yd. Cast Front Dipper
1—¾ cu. yd. Blaw-Knox Clamshell Bucket

F. H. Beckler Athens, Ohio

FOR SALE

One 27E Rex Paver; Adams power control unit (two drum hydraulic). One bulldozer blade 3½' x 9' with sidearms; Baker roadripper, Model 2A171; Stroudsberg H.D. power drum; 75 Lorain silent chain; Caterpillar housings for No. 50, D7—RD8; ¾ yd. Page dragline; 1-yd. Owen clamshell bucket; 3 Euclid 1½ yd. scrapers—$150 each; One WXC-3 Hercules motor 4¼ x 4½; one 6 cylinder Waukesha motor.
All kinds of usable A.C., Int. & Caterpillar Cletrac tracks. 2 yd. Isaacson & Euclid Rotary Scrapers. Sam., P. O. Box 182, East Point, Georgia.

THREE BUCYRUS-ARMSTRONG Model 29 Blast Hole Drills; caterpillar mounted; electric powered, 3 phase, 60 cycle, 440 volt; in running condition; with 6" string of tools; price, southern Illinois, $3000 each. Box 2957

1—SHOVEL, Koehring Model No. 2, 1¼ yd., powered by 4 cylinder Gasoline Engine ..... $ 8,250.00
1—COMBINATION SHOVEL AND CRANE, Osgood, 1 yd., 35' boom, powered by 4 cylinder Gasoline Engine ..... $ 5,000.00
1—CRANE, P&H, Model 206, 40' boom, powered by 4 cylinder Gasoline Engine ..... $ 2,500.00
1—CONCRETE PAVER, Koehring Model 27E, complete with boom, bucket, water tanks, etc. ..... $ 1,995.00
1—PAVING MACHINE, Adnun Blacktop, good condition ..... $ 3,795.00
1—CRUSHER, Good Roads 10x40 Roller Bearing Jaw Crusher, adjustable to 15x40, with 30' bucket elevator ..... $ 4,365.00
1—SUBGRADER, R B Fine, complete with transportation wheels and bridge—adjustable 18' 20' and 22'.... $ 3,960.00
2—TAMPING ROLLERS, Double Drum Sheepfoot ..... EACH $ 775.00
10—LIGHT PLANTS, Master Model MG3, 2 KVA, New and Unused ..... EACH $ 350.00
1—TRACTOR AND BULLDOZER, "CATERPILLAR" Diesel 40 Tractor with generator lighting system and with LeTourneau Bulldozer and single drum Power Control Unit.... $ 3,973.75
1—TRACTOR, SCRAPER AND CRAWLER WAGON, "Caterpillar" D8 Tractor, serial No. 1-H2255, equipped with LeTourneau YR12 Scraper, serial No. 3304-YR12, and double drum Power Unit, serial No. 2660C75 and LaPlant-Choate 10 cu. yd. Crawler Type Wagon with rock body, side dump, serial No. 10-43.... $11,147.00
1—SCRAPER, Baker Model 190-221, less pump ..... $ 1,122.00

ROY-C-WHAYNE
SUPPLY COMPANY
Louisville Kentucky

FOR SALE

15 2-Yd. 24" ga. Tunnel Cars
2 Jeffrey 24" ga. 3-Ton Battery Locos
5 Goodman 36" ga. 8-Ton Combination Locos
2 Battery Charger Sets
2 Mancha 36" ga. 5-Ton Battery Locos
2 Plymouth 36" ga. 8-Ton Gasoline Locos
1 Plymouth Standard Ga. 12-Ton Gasoline Loco
2 Conway 20A Mucking Machines 24" ga.
3 Sullivan Air Compressors—600 to 1100 cu. ft.
1 250-Ton Batching Plant
1 1600-bbl. Cement Silo
1 Insley Heavy Duty Steel Concrete Tower
3 Lakewood 2-yd. Roll-over Buckets
1 Set Sand Rolls 16" x 36" Colo. Iron Works
1 Diamond Crushing Plant 9"x36" Crusher
3 Austin & Buckeye Trench Machines
2 Sprinkling Water Trucks
2 60" Revolving Gravel Screens
1 4-cu. yd. Esco Dragline Bucket
2 Thomas 2 Drum Drag Scraper Hoists 100 & 200 H.P. Electric Motors, Pumps, Saws, etc.

BRODERICK & GORDON
1900—31st Street Denver, Colorado

TRAILER

One 35-ton heavy duty trailer and White tractor. In first class shape. Minnesota. Box 2964

WANTED

½ YARD GASOLINE SHOVEL WITH BACKHOE ATTACHMENT. CASH BEFORE SHIPMENT. DUKE EQUIPMENT CO., 297 DUKE ST., MONTREAL, CANADA.

WANTED TO BUY

50 ft. Boom, 1 yd. Clamshell Bucket, and front drum and air controls for GA-2 Erie Shovel. Oak Construction Co., 220 E. 7th St., Royal Oak, Mich. Phone: Lincoln 1-1278.

WANTED

One lifting magnet or one set of Grapples hooks. Sam., P. O. Box 182, East Point, Ga.

WANTED

Backhoe and shovel attachments for Link Belt Speeder Model LS 80.
10 ton, 3-wheel gasoline roller.
5 ton tandem roller. Equipment trailers.
Caterpillar Road Patrol No. 12.
Compressor and concrete breaking tools.
Six wheel dump trucks.
Portable Welders. Trenching Machinery.
Give full particulars. Box 2962

WANTED

¾ yd. shovel front complete for Model 38 or 42 or 45 Bay City Shovel. Must be in good condition. Bridgeport Sand and Gravel Co., 218 Charles Street, Bridgeport, Conn.

WANT TO RENT

Gasoline or steam locomotive (prefer gas), standard gauge, 8 to 30 tons. Indiana. Box 2963